

MONTHLY WATER INVENTORY REPORT FOR OHIO

January 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION for January was above normal throughout Ohio; only a few scattered locations had below normal precipitation. The state average was 3.54 inches, 0.78 inch above normal. Regional averages ranged from 4.85 inches, 1.88 inches above normal, for the Southeast Region to 2.43 inches, 0.25 inch above normal, for the Northwest Region. Marietta State Nursery (Washington County) reported the greatest amount of precipitation for the month, 6.88 inches. Lima (Allen County) reported the least amount, 1.98 inches.

Precipitation during January generally fell as snow during most of the month especially in the northern two-thirds of the state, but as rain on several days during the last week. Many locations reported measurable precipitation on one-third to nearly one-half of the days in January, but only a few days had significant amounts of precipitation. Storms passed through Ohio on January 3-4 dumping large accumulations of snow especially in south-central and southeastern Ohio counties where more than two feet was reported in some areas. Snow emergencies were declared in many areas. Small amounts of snow continued to be added to this through mid-month as sub-freezing temperatures restricted melting. Another storm passed through Ohio on January 16-17 with additional large accumulations of snow in many areas of the state. Bitterly cold temperatures had invaded Ohio a day or two prior to this storm, but after this storm system passed through the state, record-breaking cold temperatures settled in across Ohio through the end of the week. Temperatures warmed to above freezing early the last week of the month and the snow which had accumulated all month began to melt. Another storm system arrived with the warming temperatures and unfortunately, produced widespread rain. Most areas of Ohio reported from 1 inch to more than 2 inches of rain during January 25-28. The snowmelt and rainfall, compounded by ice jams, brought many streams and rivers out of their banks. Moderate flooding was a problem statewide including the Ohio River and the Lake Erie shoreline. Governor Voinovich has requested that 20 eastern Ohio counties be declared federal disaster areas as a result of the major snowfall and flooding during the month.

Precipitation for the 1994 water year is above normal throughout most of the state with only the Northwest Region having slightly below normal precipitation. The state average is 13.32 inches, 2.99 inches above normal. Regional averages range from 14.72 inches, 3.89

(continued on back)

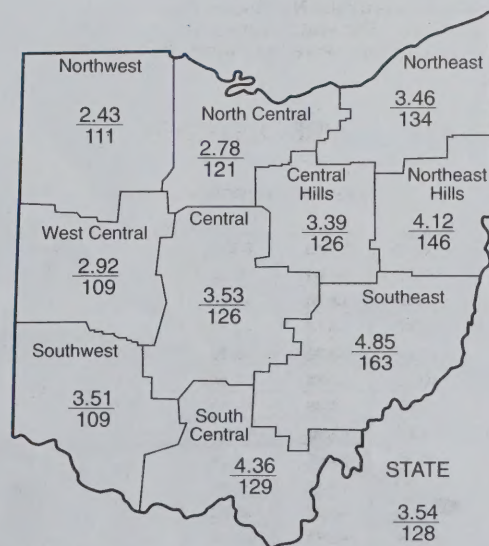
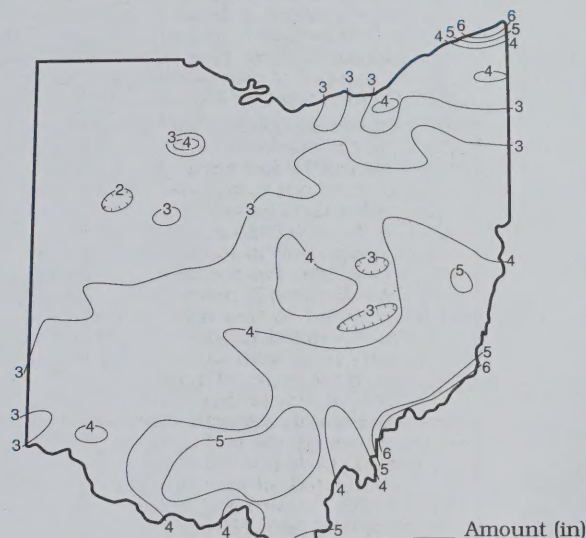
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.25 | +0.04 | -0.02 | -0.64 | +8.33 | -1.1 |
| North Central | +0.48 | +2.36 | +1.42 | -0.64 | +10.64 | -0.2 |
| Northeast | +0.87 | +3.37 | +4.12 | +4.01 | +13.66 | +2.4 |
| West Central | +0.25 | +3.30 | +3.20 | +6.89 | +12.61 | +0.8 |
| Central | +0.72 | +2.95 | +1.96 | +3.79 | +8.81 | +1.9 |
| Central Hills | +0.69 | +3.45 | +1.62 | +2.11 | +6.11 | +0.6 |
| Northeast Hills | +1.29 | +3.40 | +3.20 | +3.18 | +4.59 | +2.3 |
| Southwest | +0.28 | +1.67 | +1.64 | +0.03 | -0.84 | +1.5 |
| South Central | +0.99 | +1.66 | +0.34 | -3.33 | -9.19 | +0.1 |
| Southeast | +1.88 | +2.97 | +2.80 | +0.42 | -3.15 | +1.8 |
| State | +0.78 | +2.53 | +2.03 | +1.60 | +5.17 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION JANUARY 1994



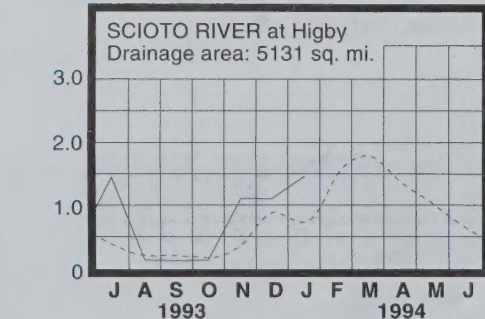
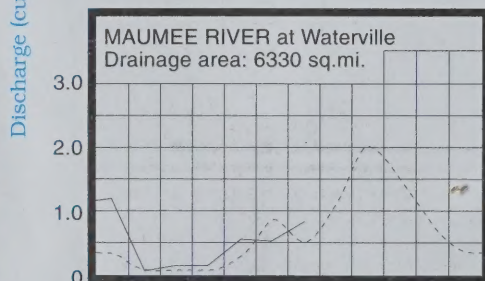
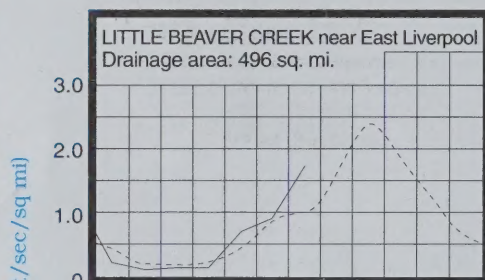
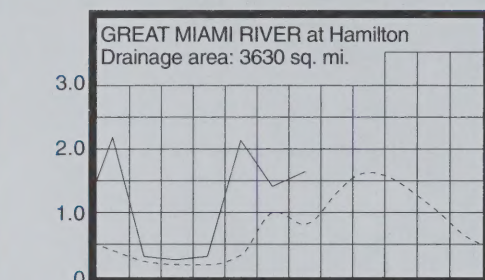
Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,096 | 199 | 130 | 108 | 116 |
| Great Miami River at Hamilton | 3,630 | 6,131 | 207 | 171 | 158 | 144 |
| Huron River at Milan | 371 | 489 | 138 | 148 | 120 | 117 |
| Killbuck Creek at Killbuck | 464 | 617 | 164 | 133 | 117 | 112 |
| Little Beaver Creek near East Liverpool | 496 | 858 | 173 | 128 | 116 | 107 |
| Maumee River at Waterville | 6,330 | 5,182 | 165 | 90 | 76 | 110 |
| Muskingum River at McConnellsville | 7,422 | 8,575 | 108 | 133 | 118 | 109 |
| Scioto River near Prospect | 567 | 852 | 252 | 244 | 206 | 138 |
| Scioto River at Higby | 5,131 | 7,480 | 201 | 155 | 132 | 123 |
| Stillwater River at Pleasant Hill | 503 | 906 | 251 | 283 | 244 | 166 |

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - - Current - - - - -

STREAMFLOW during January was above normal throughout Ohio as a result of high flows near the end of the month. Flows in most areas of the state were high enough to be considered excessive.

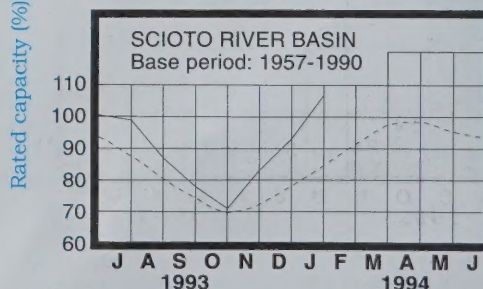
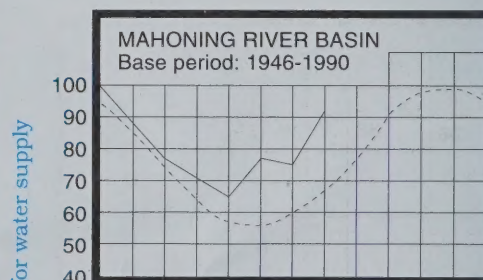
Flows at the beginning of the month were below normal throughout most of the state; only the extreme northeastern drainage basins started the month with above normal flows. Generally, flows were rather stable during most of the month, increasing slightly following precipitation and declining as soils and surface moisture re-froze. Lowest flows for January in most drainage basins occurred around mid-month. Flows increased rapidly during the last week of the month following snowmelt and precipitation. The runoff from

frozen soils, compounded by ice jams, caused moderate flooding of low-lying areas, streams and rivers and also along the Ohio River and the Lake Erie shoreline. The eastern half of the state was the most severely impacted. The greatest flows for January occurred just before the end of the month, and as January ended, flows remained excessive throughout the state.

RESERVOIR STORAGE for water supply during January increased noticeably in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of January in the Mahoning basin index reservoirs was 92 percent of rated capacity for water supply compared with 75 percent for last month and 79 percent for January 1993. Month-end storage in the Scioto basin index reservoirs was 107 percent of rated capacity for water supply compared with 93 percent for last month and 105 percent for January 1993.

RESERVOIR STORAGE FOR WATER SUPPLY

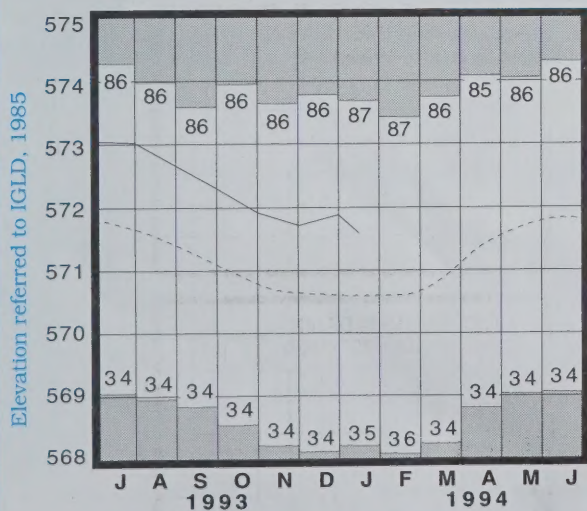


GROUND-WATER LEVELS during January were stable or declined during most of the month, but began to rise sharply near the month's end. Net changes from December's levels during January were less than usually observed.

Ground-water storage continues to remain at below normal levels in the eastern half of the state. Also, storage in most aquifers is lower than last year; however, levels in shallow aquifers, especially unconsolidated aquifers adjacent to rivers, were rising at the end of January. The frozen soils could reduce the amount of delayed recharge to deeper aquifers. Even though conditions favor continued improvement in ground-water storage, near-normal climatic conditions will be necessary to initiate and sustain the projected improvement.

LAKE ERIE level declined during January. The mean level was 571.59 feet (IGLD-1985), 0.29 foot below last month's mean level and 0.99 foot above normal. This month's level is 1.24 feet below the January 1993 level and 2.39 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

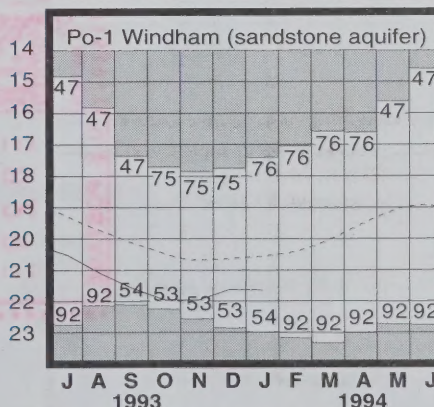
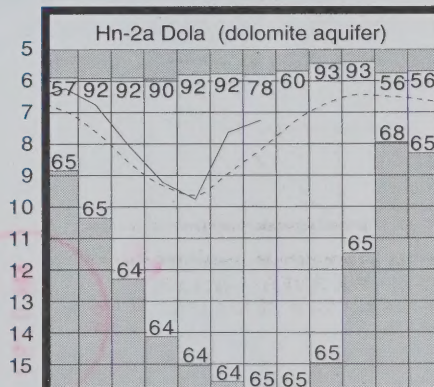
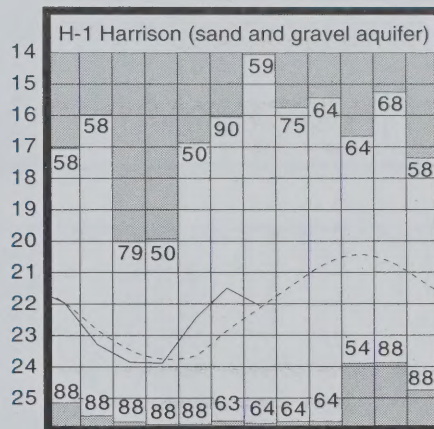
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 16.45 | -0.90 | +0.43 | +1.09 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.80 | -0.36 | +0.61 | -0.44 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.78 | +0.83 | +0.19 | -0.18 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.07 | +0.06 | -0.48 | -0.17 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.26 | +0.94 | +0.37 | -1.14 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.63 | -1.08 | -0.02 | -0.59 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.22 | -2.29 | -0.01 | -1.49 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

inches above normal, for the Northeast Region to 8.72 inches, 0.49 inch below normal, for the Northwest Region.

Calendar year 1994 is off to a good start as far as precipitation is concerned. Even though the snow is inconvenient and the frozen soils reduced infiltration, water supplies should benefit from the above normal precipitation. Near-normal precipitation during the remainder of the recharge season will ensure the continued improvement in water-supply storage.

SUMMARY

Precipitation was above normal throughout the state. Stream-flow was excessive in most of Ohio's drainage basins. Moderate flooding caused by snowmelt, rainfall and ice jams occurred during the last few days of the month. Reservoir storage increased and remained at above normal levels. Ground-water storage was stable but began to increase at the end of the month. Lake Erie level declined 0.29 foot and was 0.99 foot above the long-term January average.

NOTES AND COMMENTS

CLINTON COUNTY WATER RESOURCES RECONNAISSANCE STUDY

The Louisville District of the U. S. Army Corps of Engineers has released the "Clinton County, Ohio Water Resources Reconnaissance Study." The study considered water supply needs for the area around Caesar Creek Lake to determine if any modifications to the Corps project are needed to meet future water supply needs. The finding of the study is that no additional water supply storage is needed in Caesar Creek Lake.

The Water Planning Unit of the Division of Water provided planning assistance in the development of this reconnaissance report. Assessments were made of area water supply systems and sources and projections made of future demand for water. In addition, an analysis of the lake's water quality was conducted by the Corps as part of the study. Copies of the report were distributed to area water suppliers and to the Division of Water where it is available for viewing.

LOGJAM REMOVAL TASK FORCE REPORT COMPLETED

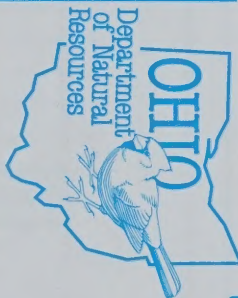
The report of the Logjam Removal Task Force (LJRTF) has been sent to the Ohio Emergency Management Agency for transmittal to the Federal Emergency Management Agency (FEMA). The Ohio Department of Natural Resources served as the lead agency for this task force. The Division of Water compiled the report. The formation of the LJRTF was recommended after the Massieville (Ross County) flooding in the "Inter-Agency Hazard Mitigation Team Report, Ohio Flooding July 1992" prepared by FEMA.

The report contains an analysis of the current situation facing landowners regarding the removal of debris from Ohio's streams, statutory and regulatory authorities related to obstruction removal, a description of the LJRTF's consensus opinion of what should be accomplished in obstruction removal projects and recommendations of several actions to facilitate those projects in the future. Copies of the LJRTF's report are available from the Division of Water (contact: Margo Fulmer at (614) 265-6757).

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

James R. Morris
Chief

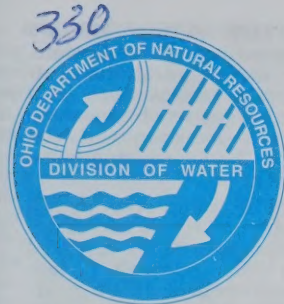
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Illinois State Water Survey Library



MONTHLY WATER INVENTORY REPORT FOR OHIO

February 1994

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Hydrologist
Water Inventory Unit

PRECIPITATION for February was below normal throughout most of Ohio with only the South Central Region having above normal precipitation. The state average was 1.84 inches, 0.40 inch below normal. Regional averages ranged from 3.99 inches, 1.21 inches above normal, for the South Central Region to 1.03 inches, 0.84 inch below normal, for the North Central Region. Gallipolis Locks and Dam (Gallia County) reported the greatest amount of precipitation for the month, 5.27 inches. Willard (Huron County) reported the least amount, 0.52 inch. Many locations in the northern one-third of the state received less than 1 inch of precipitation in February.

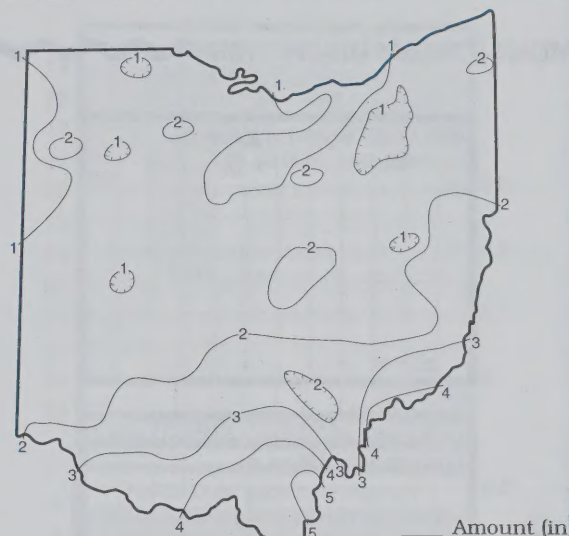
Most of the precipitation during February fell during two stormy periods. The first was during February 7-9 when the central and southern areas of the state were coated with several inches of ice caused by freezing rain. The precipitation fell as snow in the northern portion of the state. Total precipitation (liquid, melted) ranged from more than 2 inches in extreme southern Ohio to less than 0.5 inch in northern Ohio. The ice coating in central and southern Ohio remained for more than a week as temperatures consistently ranged below normal.

The second stormy period was during February 20-24. The precipitation fell as rain in most of Ohio early in this period but changed to snow statewide by the end of the five day period. Once again, the southern half of the state received the most precipitation with between 1 and 2 inches reported at most locations. The greatest amounts fell during February 23 which resulted in minor flooding in some areas.

Precipitation for the 1994 calendar year is above normal in the eastern half of Ohio and below normal in the western half. The state average is 5.38 inches, 0.38 inch above normal. Regional averages range from 8.35 inches, 2.20 inches above normal, for the South Central Region to 3.63 inches, 0.39 inch below normal, for the Northwest Region.

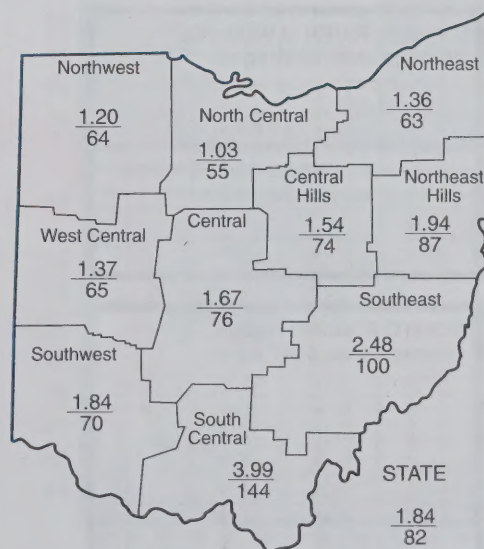
Precipitation for the 1994 water year is above normal throughout most of Ohio with only the Northwest Region having below normal precipitation. The state average is 15.17 inches, 2.60 inches above normal. Regional averages range from 17.91 inches, 3.79 inches above normal, for the South Central Region to 9.92 inches, 1.13 inches below normal, for the Northwest Region.

PRECIPITATION FEBRUARY 1994



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.64 | -1.43 | +0.64 | -1.08 | +8.26 | -1.3 |
| North Central | -0.84 | -0.67 | +2.94 | -1.41 | +9.89 | -2.3 |
| Northeast | -0.81 | +0.03 | +5.10 | +3.28 | +13.03 | +0.3 |
| West Central | -0.74 | -0.88 | +3.72 | +6.13 | +13.07 | +1.2 |
| Central | -0.54 | -0.25 | +3.79 | +3.25 | +9.36 | +1.8 |
| Central Hills | -0.55 | -0.04 | +3.97 | +1.90 | +6.38 | -0.6 |
| Northeast Hills | -0.29 | +0.67 | +5.27 | +2.70 | +5.04 | +0.6 |
| Southwest | -0.78 | -1.07 | +1.73 | -0.82 | +0.07 | +0.8 |
| South Central | +1.21 | +1.46 | +3.97 | -1.82 | -6.96 | +1.0 |
| Southeast | -0.01 | +1.21 | +4.72 | +0.59 | -1.97 | +1.9 |
| State | -0.40 | -0.09 | +3.59 | +1.29 | +5.63 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
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-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

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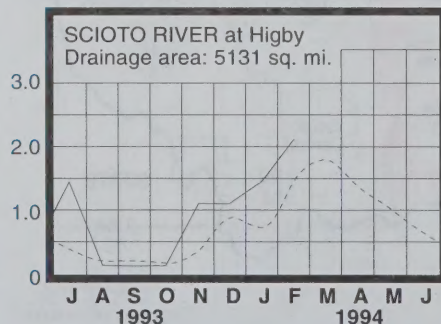
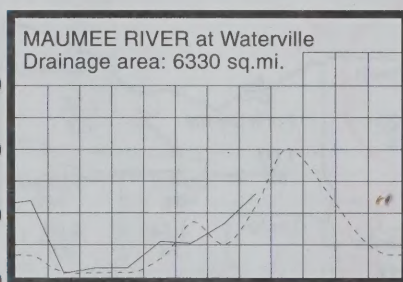
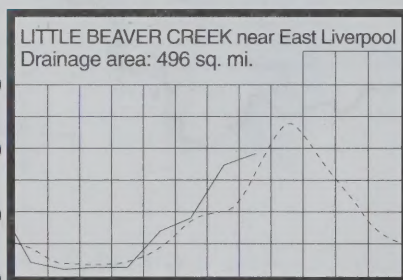
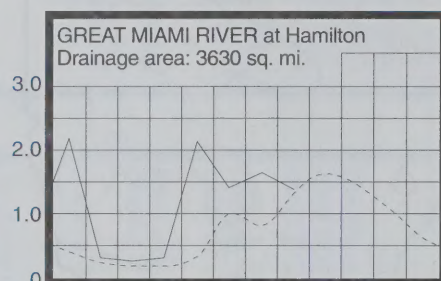
Average (in)
Percent of normal

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,205 | 112 | 118 | 115 | 121 |
| Great Miami River at Hamilton | 3,630 | 5,018 | 103 | 135 | 149 | 147 |
| Huron River at Milan | 371 | 554 | 119 | 103 | 117 | 126 |
| Killbuck Creek at Killbuck | 464 | 1,013 | 145 | 131 | 120 | 122 |
| Little Beaver Creek near East Liverpool | 496 | 957 | 114 | 120 | 110 | 111 |
| Maumee River at Waterville | 6,330 | 8,301 | 118 | 92 | 88 | 118 |
| Muskingum River at McConnelsville | 7,422 | 20,426 | 168 | 136 | 131 | 121 |
| Scioto River near Prospect | 567 | 925 | 138 | 155 | 173 | 148 |
| Scioto River at Higby | 5,131 | 10,993 | 145 | 138 | 133 | 131 |
| Stillwater River at Pleasant Hill | 503 | 642 | 115 | 145 | 182 | 170 |

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

Normal - - - - - Current - - - - -

STREAMFLOW during February was above normal throughout the state. Flows in the south-central and east-central drainage basins were high enough to be considered excessive. Streamflow during February increased seasonally from the flows during January.

Flows at the beginning of the month were noticeably above normal statewide, still responding to the runoff of precipitation and snowmelt of late January. Many areas had their greatest flows for February at the start of the month. Generally, flows declined until reaching their lowest point at mid-month. Flows then began to increase slowly as ice and snow melted, and then rose sharply after February 20 following widespread precipitation.

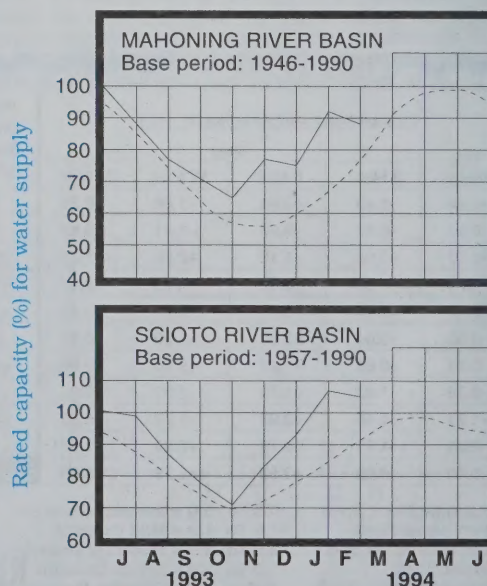
Some drainage basins had their greatest flows for the month on February 24. Minor flooding was reported in the northwestern, south-central and southeastern areas of the state. Also, ice jams caused additional flooding problems along most of the Lake Erie shoreline area. By the end of the month, flows had declined to below normal in the western half of the state but remained above normal in the eastern half.

RESERVOIR STORAGE for water supply during February decreased slightly in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of February in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply compared with 92 percent for last month and 80 percent for February 1993. Storage at the end of February in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with 107 percent for last month and 104 percent for February 1993.

Surface-water supplies continue to remain in a favorable position across the state. Currently, both on- and off-stream reservoirs are near or above normal seasonal levels. Reservoirs that are drawn down for additional flood-water storage in the fall will be brought up, to summer pool levels in April.

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

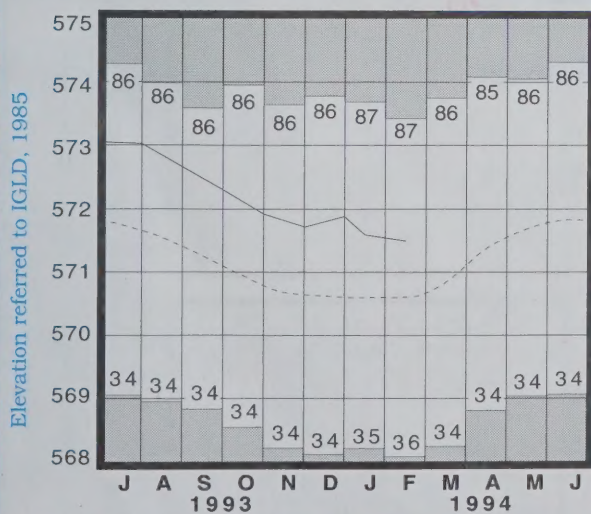
during February showed mixed responses across the state. Most aquifers showed net improvement in ground-water storage during the month when compared with January, averaging near what is usually observed. Generally, levels in most shallow aquifers rose during the early part of the month and then declined during the remainder of the month; levels in deeper aquifers were variable with some aquifers being stable, some declining slowly and a smaller number showing slight rises during the month.

Ground-water storage continues to be at below normal levels in the eastern half of Ohio and at above normal levels in most aquifers in the western half of the state. Levels in most deeper aquifers are lower than last year while in shallow aquifers, ground-water storage is slightly greater than last year. The progression of the 1994 water year recharge season has been mixed. Precipitation has fluctuated between above and below normal. Frozen soils often resulted in runoff instead of infiltration. A couple of months remain with the potential for important recharge. Conditions still favor continued improvement in ground-water storage, but it is now essential that near or slightly above normal precipitation occur if levels are to recover to normal.

LAKE ERIE level declined during February. The mean level was 571.49 feet (IGLD-1985), 0.10 foot below last month's mean level and 0.89 foot above normal. This month's level is 1.21 feet below the February 1993 level and 2.29 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation during February in the Lake Erie basin averaged 1.3 inches, 0.8 inch below normal. Precipitation during February throughout the entire Great Lakes basin averaged 1.2 inches, 0.6 inch below normal. Cumulative precipitation for 1994 in the Lake Erie basin averages 4.2 inches, 0.3 inch below normal; 1994 precipitation for the entire Great Lakes basin averages 3.3 inches, 0.6 inch below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

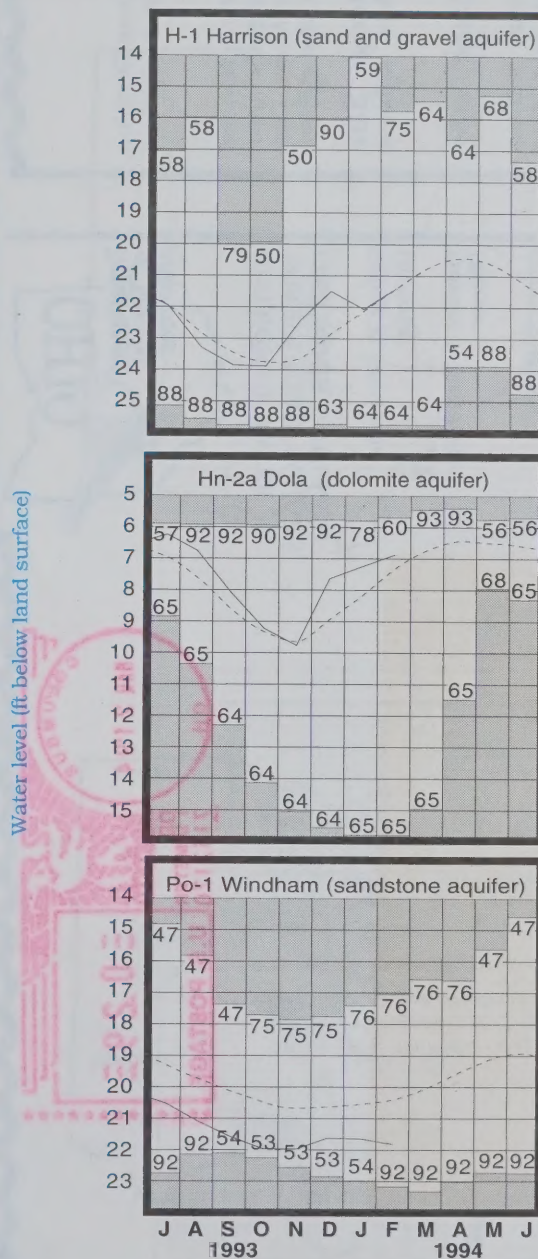
Normal - - - - Current - - - -

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.53 | -0.05 | +1.92 | +1.31 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.41 | -0.33 | +0.39 | -0.45 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.34 | +0.75 | +0.44 | -0.25 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.40 | 0.00 | +0.67 | +0.75 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.88 | +0.46 | +0.38 | -0.64 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.82 | -1.42 | -0.19 | -0.82 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.42 | -1.28 | +1.80 | +0.21 |

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation during February was below normal in most of Ohio with only the South Central Region receiving above normal precipitation. Streamflow was above normal statewide with some minor flooding around February 24. Ice jams caused additional problems along the Lake Erie shoreline. Reservoir storage declined slightly but remained at above normal levels. Lake Erie level declined 0.10 foot and was 0.89 foot above the long-term February average.

NOTES AND COMMENTS

WWFRP MOVES TO GWRS

The Water Withdrawal Facility Registration Program (WWFRP) was recently transferred to the Ground Water Resources Section's (GWRS) Water Inventory Unit from another Division of Water's section, Water Resources Development. Ohio Revised Code section 1521.16 requires, among other things, water withdrawal facilities with the capacity to withdraw more than 100,000 gallons of water per day (70 gallons per minute) to register with the Division of Water. Additionally, an annual report of the actual withdrawal is required to be filed with the Division.

The transfer of the WWFRP to the GWRS will improve the overall function of the program in many ways. Nearly 70 percent of the registered facilities use ground water as all or part of their source. The GWRS relies on the WWFRP information for many projects and the WWFRP is continuously reviewing the GWRS well logs. Proximity will make this effort more efficient. Also, the Division's large basic data files (well logs, ground-water levels, precipitation, etc.) are maintained in the GWRS. A central location for this data that are frequently requested by the general public, business, and other government agencies will make access easier. Overall management, QA/QC, and interaction will also be improved.

TWO EMPLOYEES JOIN GWRS STAFF

Allan Luczyk has joined the GWRS as a water resource specialist. Al has been employed at ODNR since 1980. He previously worked for the divisions of Oil and Gas and Geological Survey as an environmental technician. In 1991, he transferred to the Division of Water where he started working with the WWFRP. At the GWRS he will continue to maintain the WWFRP data files, provide technical assistance and answer requests for information.

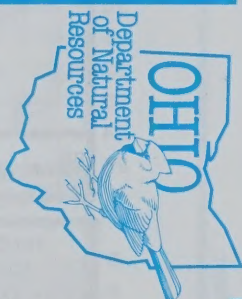
Al has a Bachelor of Science degree from Bowling Green State University with a dual major in geology and geography. After work, Al enjoys fishing, golf and various outdoor activities with his wife and three children.

Gregg Russell has joined the GWRS as a records management officer. Gregg has been employed at ODNR since 1986. He previously worked for the divisions of Reclamation and Watercraft as a data entry and computer operator. At the GWRS, Gregg will be assisting in maintaining the division's well log data base and computerization process on the Wang computer/optical disk system. Holding a degree in data processing has been a valuable asset for Gregg in his employment at ODNR. After work, Gregg can often be found walking through one of the Franklin County Metro Parks. Gregg insists that walking is the best way to unwind from a hard day at the office and a computer terminal.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

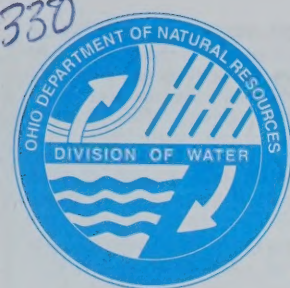
Frances S. Buchholzer
Director

James R. Morris
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO March 1994

Compiled By David H. Cashell
Water Inventory Unit

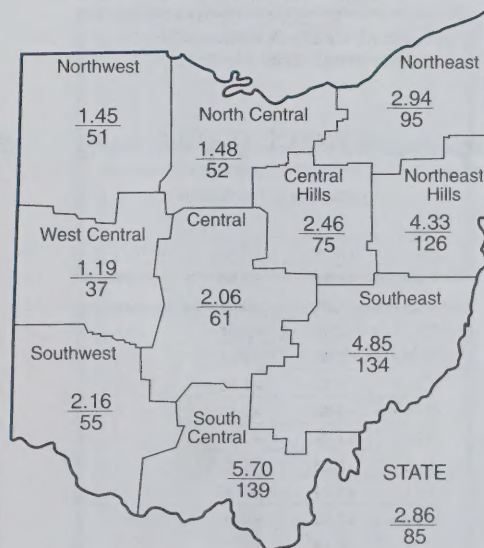
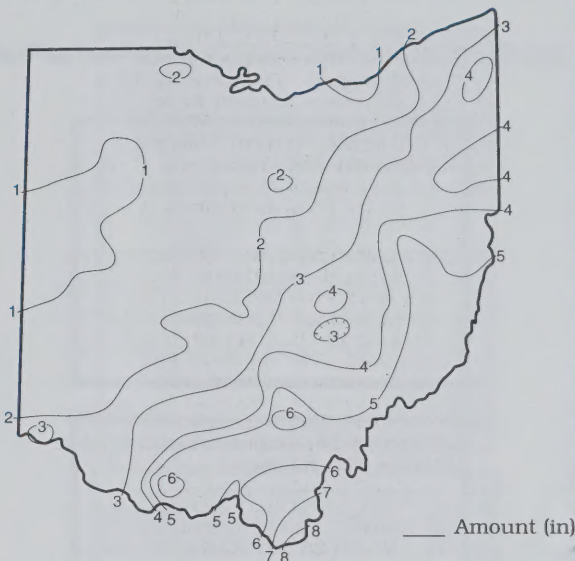
PRECIPITATION for March was below normal throughout most of Ohio but above normal in the eastern and south-central areas. The state average was 2.86 inches, 0.52 inch below normal. Regional averages ranged from 5.70 inches, 1.61 inches above normal, for the South Central Region to 1.19 inches, 2.07 inches below normal, for the West Central Region. This was the eight driest March on record for the West Central Region. Gallipolis Locks and Dam (Gallia County) reported the greatest amount of precipitation for March, 6.96 inches (Note: Huntington Airport, West Virginia reported 8.62 inches, its wettest March on record). McArthur (Vinton County), Sciotoville (Scioto County) and West Union (Adams County) also reported more than 6 inches of precipitation in March. St. Marys (Auglaize County) reported the least amount of March precipitation, 0.45 inch.

Precipitation during March varied greatly across the state with the largest amounts falling in the southeast, diminishing uniformly to the northwest. Many storms tracked just south and east of Ohio thus producing the greatest amount of precipitation in the southern and eastern sections of the state. The first significant precipitation for the month fell on March 9-10. The northern half of the state received snow while the southeastern area received rain. Rain amounts in southeastern Ohio of 1 to nearly 2 inches were common and in some south-central areas, more than 2 inches were reported. Scattered showers during March 13-14 produced up to 0.5 inch of rain in parts of Ohio, but generally, the middle of the month was rather dry. Storms during March 21-23 again produced from 1 to more than 2 inches of rain in southeastern Ohio tapering to only small amounts in the northwestern area. Most areas of the state received some precipitation during March 26-28. Again, the southeastern area of Ohio recorded the greatest amounts, especially on Palm Sunday, March 27. These storms were part of the same system that spawned killer tornados in Alabama.

Precipitation for the 1994 calendar year is below normal throughout most of the state but above normal in the Northeast Hills, South Central and Southeast regions. The state average is 8.24 inches, 0.14 inch below normal. Regional averages range from 14.05 inches, 3.81 inches above normal, for the South Central Region to 5.08 inches, 1.81 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past three months column).

(continued on back)

PRECIPITATION MARCH 1994



Average (in)
Percent of normal

PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.42 | -1.81 | -2.55 | -2.21 | +6.69 | -1.2 |
| North Central | -1.38 | -1.74 | +0.52 | -3.16 | +8.58 | -1.1 |
| Northeast | -0.17 | -0.11 | +2.91 | +2.11 | +12.84 | +0.4 |
| West Central | -2.07 | -2.56 | +0.63 | +5.06 | +11.67 | +0.1 |
| Central | -1.31 | -1.13 | +1.90 | +1.89 | +7.77 | +0.6 |
| Central Hills | -0.80 | -0.66 | +2.51 | +0.46 | +5.57 | -0.3 |
| Northeast Hills | +0.88 | +1.88 | +4.30 | +2.89 | +5.78 | +0.9 |
| Southwest | -1.76 | -2.26 | +0.01 | -1.59 | -1.28 | +0.1 |
| South Central | +1.61 | +3.81 | +5.40 | -0.21 | -5.42 | +1.5 |
| Southeast | +1.23 | +3.10 | +5.10 | +0.95 | -1.13 | +2.0 |
| State | -0.52 | -0.14 | +2.08 | +0.63 | +5.12 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | This Month Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|------------------------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,155 | 113 | 123 | 118 | 103 |
| Great Miami River at Hamilton | 3,630 | 3,255 | 55 | 92 | 124 | 132 |
| Huron River at Milan | 371 | 400 | 57 | 85 | 103 | 93 |
| Killbuck Creek at Killbuck | 464 | 754 | 80 | 126 | 135 | 107 |
| Little Beaver Creek near East Liverpool | 496 | 1,392 | 118 | 130 | 130 | 100 |
| Maumee River at Waterville | 6,330 | 6,604 | 52 | 81 | 85 | 95 |
| Muskingum River at McConnelsville | 7,422 | 15,650 | 97 | 127 | 133 | 111 |
| Scioto River near Prospect | 567 | 486 | 50 | 97 | 131 | 118 |
| Scioto River at Higby | 5,131 | 6,689 | 73 | 102 | 115 | 112 |
| Stillwater River at Pleasant Hill | 503 | 331 | 40 | 82 | 145 | 149 |

STREAMFLOW during March was below normal in most Ohio drainage basins but above normal in the eastern area of the state where precipitation was above normal. Flows in the western half of the state were low enough to be considered deficient. Streamflow during March was less than the flows during February in most areas.

Flows at the beginning of the month were below normal throughout the state. Generally, flows declined during the first week of March. Drainage basins in eastern Ohio had their lowest flows for March during this period. Flows increased following local precipitation during the next two weeks of March. Drainage basins in the central

and western areas of Ohio had their greatest flows around mid-month while eastern Ohio basins had their greatest flows during March 22-24. Flows declined during the last week of March with central and western Ohio drainage basins having their lowest flows at or near the end of the month. Flows at the end of the month were below normal throughout the state.

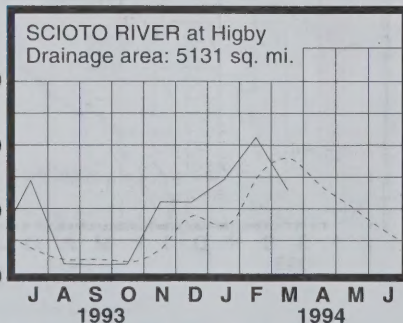
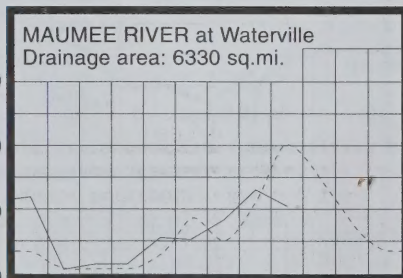
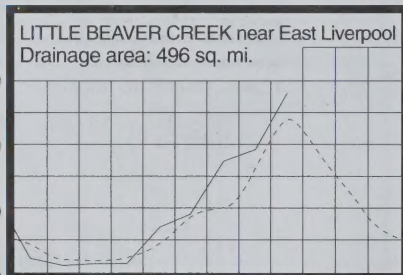
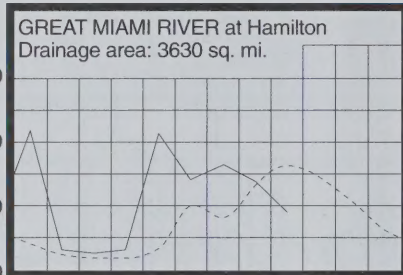
RESERVOIR STORAGE for water supply increased in the Mahoning basin reservoirs but decreased slightly in the Scioto basin reservoirs. Storage remained above normal in both basins.

Reservoir storage at the end of March in the Mahoning basin index reservoirs was 97 percent of rated capacity for water supply compared with 88 percent for last month and 96 percent for March 1993. Month-end storage in the Scioto basin index reservoirs was 104 percent of rated capacity for water supply compared with 105 percent for last month and 105 percent for March 1993.

Surface-water supplies continue to remain in excellent condition throughout Ohio. Both on- and off-stream reservoirs are at or near normal seasonal levels.

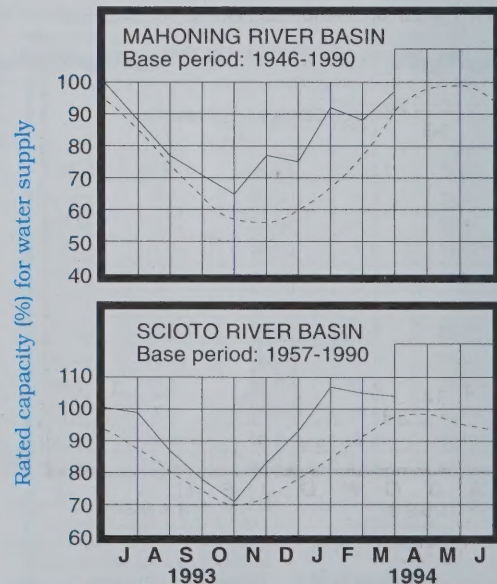
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

during March showed some improvement in most aquifers in Ohio. Net rises during March from the levels in February averaged about one-half that usually observed. Some shallow sand and gravel aquifers in western Ohio had net declines during the month. Generally, ground-water levels were stable during the first ten days of March, rose during the middle ten days and then were stable during the remainder of the month.

The below normal precipitation in much of Ohio during February and March has not been ideal for ground-water supplies. Recharge has been less than normal. Ground-water storage continues to remain below normal in most of the aquifers throughout Ohio with a few exceptions in the central and northwestern areas. Current ground-water levels are lower than the levels of a year ago throughout the state.

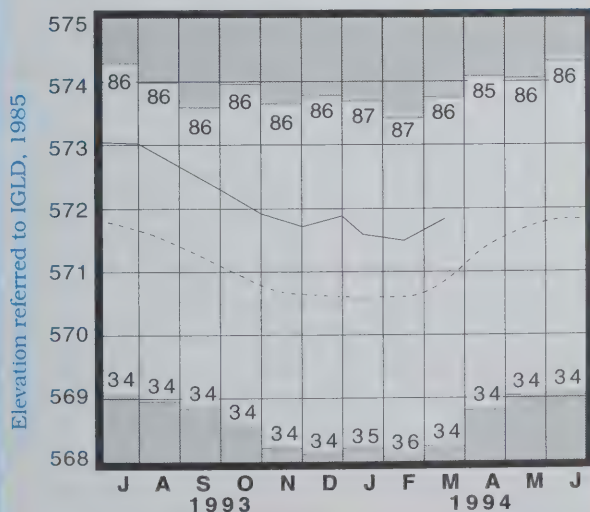
The 1994 water year recharge season will soon come to an end. Although precipitation has been above normal during the past six months in all but the Northwest Region, the past three months have seen below normal precipitation except in southeastern Ohio (see Precipitation table, departure from normal, past three and six months columns). Much of the precipitation last fall replenished the soil moisture which had been deficient due to the dry conditions in the late summer months. Ground-water storage is not expected to return to normal levels, but ample April showers can still improve the situation. Water-supply managers with ground-water sources should be concerned with the local recharge conditions and monitor their situations accordingly.

LAKE ERIE level rose seasonally during March. The mean level was 571.82 feet (IGLD-1985), 0.33 foot above last month's mean level and 0.95 foot above normal. This month's level is 0.88 foot lower than the March 1993 level and 2.62 feet above Low Water Datum.

SUMMARY

Precipitation was below normal throughout most of Ohio but above normal in the eastern and south central areas of the state. Streamflow was below normal in all but some eastern Ohio drainage basins. Reservoir storage was stable or improved slightly and remained at above normal levels. Ground-water storage improved slightly but is below normal in most aquifers statewide. Lake Erie level rose seasonally and was 0.95 foot above the long-term March average.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

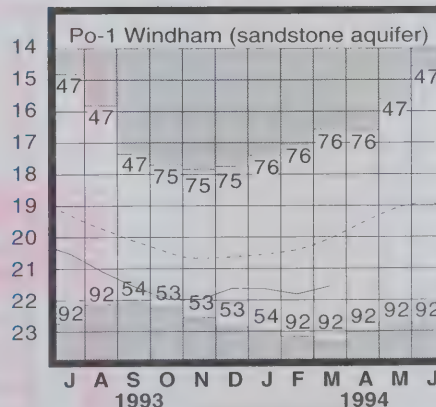
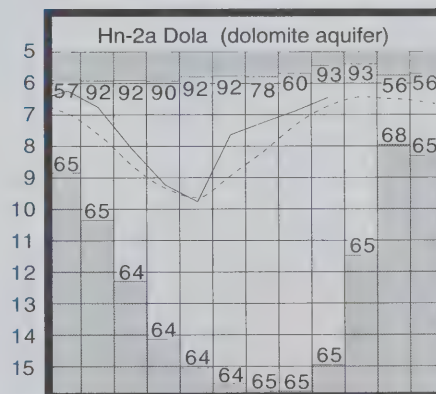
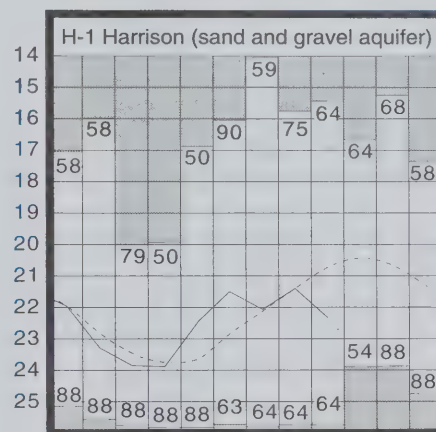
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 13.76 | -0.45 | +0.77 | -0.32 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.29 | -0.44 | +0.12 | -0.67 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.92 | +0.75 | +0.42 | -0.39 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.33 | -1.62 | -0.93 | -1.27 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.46 | +0.32 | +0.42 | -0.92 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.56 | -1.53 | +0.26 | -0.91 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.51 | -1.11 | +0.91 | -0.35 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current

(continued from front page)

Precipitation for the first half of the 1994 water year is above normal throughout most of the state with only the Northwest Region having below normal precipitation. The state average is 18.03 inches, 2.08 inches above normal. Regional averages range from 23.61 inches, 5.40 inches above normal, for the South Central Region to 11.37 inches, 2.55 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past six months column).

NOTES AND COMMENTS

MWIR SURVIVES FORTY YEARS

Rain, snow, sleet, floods, droughts, tornados, blizzards, ice, heat, cold, hurricanes, hail, high winds - never missed a beat.

March 1994 marks the 40th anniversary of the "Monthly Water Inventory Report For Ohio" (MWIR). The report, first published in March 1954, was originally titled "Monthly Summary of Ground Water Levels in Index Wells in Ohio." Shortly thereafter, in January 1955, the name was changed to the "Monthly Index of Conditions Affecting Water Supply," and in January 1973, it received its current title.

The purpose of the MWIR has been the same for the past forty years. The intent is to present in brief form hydrologic data from across Ohio which are sufficiently representative of current water conditions to permit an evaluation of the statewide water supply situation. These key observation points, often referred to as index stations, offer the best data based on accuracy, length of record, minimal artificial effects on data, and availability. These data are collected monthly by various federal and state agencies, processed immediately, and made available to the ODNR Division of Water. It is through these cooperative efforts and long-term partnerships that the MWIR has been able to endure and provide this wealth of timely information to citizens, water managers, government agencies, consulting companies and many others.

There are several other factors that have also contributed to the success of the report. One is the consistency of the data that are provided. Data from many of the sites that were initially included in the first issue of the report are still being provided today. For example, in the first report, data from thirteen observation wells were presented. Eight of these wells are still being monitored and five are still being included each month in the report. Although to a lesser extent, a similar case can be presented for the streamflow, reservoir and precipitation data. Over the years a few other types of data were presented (i.e. state lake levels, water quality), but most were included for only a few years before being discontinued.

Another factor for the success of the MWIR is in the presentation. The information is presented in a brief, concise and consistent manner. The format is that of a technical report as opposed to a newsletter. There is no need for the author to search for new material. Each month the reader can read the entire report or immediately turn to a specific section that is of particular interest to them. Although the author includes opinions of the cause and significance of the reported information, the readers are urged to examine the data and formulate their own evaluation.

Of special note is the dedication and permanence of the authors of the MWIR. Although it takes the combined efforts of many people for the complete publication of this report, only three individuals during the past forty years have had the distinction of authoring the report. Paul Kaser is responsible for originating and developing the idea of the MWIR. Paul authored the report from March 1954 through mid-1966. During his tenure, one of the worst droughts on record plagued much of Ohio (early 1960s). Paul retired in the early 1970s and moved to Arizona where he still resides. Next came Leonard Harstine who had worked for ODNR since 1959. In 1966 he accepted the challenge of authoring the MWIR and was responsible for its production through 1987. During Leonard's tenure, the report was redesigned to the smaller, yet concise format similar to the current design. Leonard saw many significant events during his authorship, but most memorable was the "Blizzard of January 1978", closely followed by the July 4, 1969 flooding and the April 1974 Xenia tornado. Leonard retired from ODNR in 1988. He still resides in Columbus, but travels frequently. His occasional visits at ODNR are enjoyed by many.

The current author is myself, David Cashell. I started working at the Division of Water in January 1979. I assumed responsibility for production of the MWIR in January 1988. In 1989, I increased the size of the report in order to incorporate some additional data and cumulative statistics. Although several drought periods have occurred during my watch, the most memorable event was the June 1990 Shadyside flash flooding.

I am proud to be associated with ODNR and such a fine publication. The previous authors, all the people who have ever assisted in the publication, and the ODNR administrations during the past forty years should be commended for their efforts in keeping this publication going. Also, the readers have always had kind and encouraging words to offer. Comments and suggestions from the readers are always welcome.

ACKNOWLEDGMENTS

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Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
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U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
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National Weather Service.



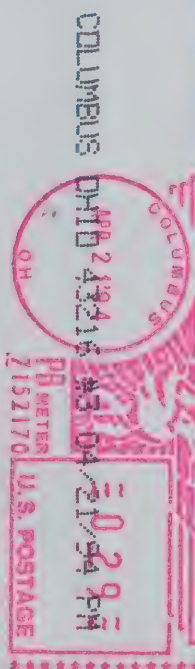
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MONTHLY WATER INVENTORY REPORT FOR OHIO

April 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION for April was above normal throughout Ohio with only a few scattered locations having below normal precipitation. The state average was 4.67 inches, 1.16 inches above normal. Regional averages ranged from 6.34 inches, 2.53 inches above normal, for the Southwest Region to 3.63 inches, 0.05 inch above normal, for the West Central Region. This was the eighth wettest April in 100 years of record for the Southwest Region. Stonelick State Park (Clermont County) reported the greatest amount of precipitation for the month, 9.06 inches. Marysville (Union County) reported the least amount, 2.66 inches.

Precipitation during April fell as rain during most of the month, but snow was common during the first week. Many areas of Ohio had a white Easter on April 3. More snow fell during April 6-7 in the northern half of the state. Most of Ohio received about 1 inch of precipitation (liquid) during these two storm periods. The next week of April was very wet throughout the state. Storms started on April 9-10 with many areas in southern Ohio receiving more than 2 inches of rain with about 1 inch falling elsewhere. Storms continued during April 11-12 with the greatest amounts of more than 2 inches falling across northern Ohio. Small stream flooding was reported and many areas had water standing in the fields. Storms with high winds crossed the state on April 15. Some damage was reported.

Soils across the state were able to start drying out during the second half of April as very little precipitation was reported during April 16-25. Showers returned to Ohio the last several days of the month with about 1 inch of rain common across the state, but spotty storms in southwestern Ohio were locally severe producing greater amounts of precipitation.

Precipitation for the 1994 calendar year is above normal in the eastern and southern areas of Ohio, but below normal in the central and northwestern areas. The state average is 12.91 inches, 1.02 inches above normal. Regional averages range from 18.98 inches, 5.00 inches above normal, for the South Central Region to 9.11 inches, 2.51 inches below normal, for the West Central Region.

Precipitation for the 1994 water year is above normal throughout most of Ohio with only the Northwest Region having below normal precipitation. The state average is 22.70 inches, 3.23 inches above normal. Regional averages range from 28.54 inches, 6.59 inches above normal, for the South Central Region to 16.02 inches, 1.21 inches below normal, for the Northwest Region.

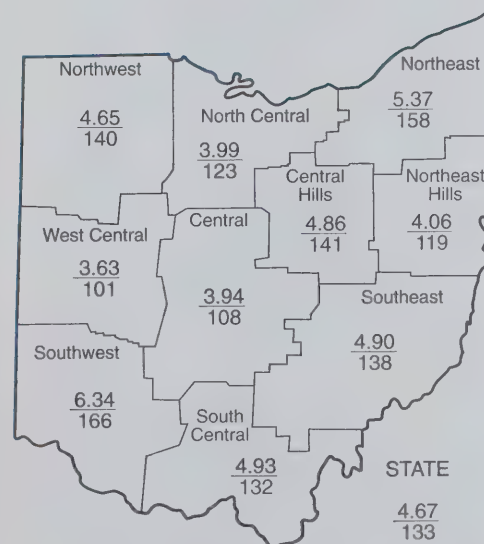
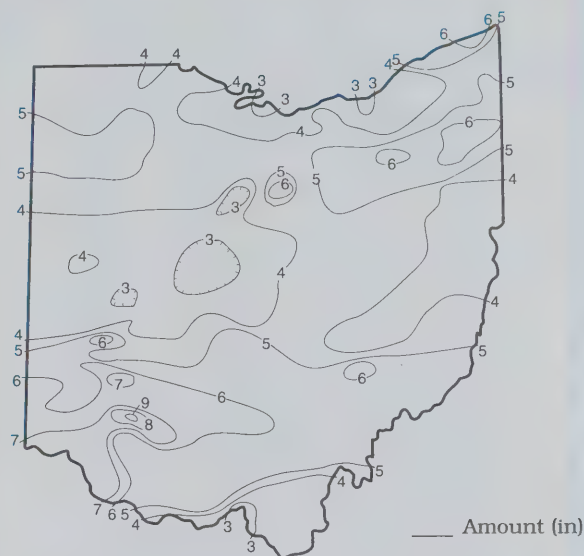
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.34 | -0.72 | -0.68 | -1.58 | +7.83 | -0.6 |
| North Central | +0.74 | -1.48 | +0.88 | -3.19 | +8.88 | -0.6 |
| Northeast | +1.98 | +1.00 | +4.37 | +3.90 | +14.74 | +0.7 |
| West Central | +0.05 | -2.76 | +0.54 | +4.29 | +10.85 | -0.2 |
| Central | +0.28 | -1.57 | +1.38 | +1.59 | +8.38 | +0.2 |
| Central Hills | +1.41 | +0.06 | +3.51 | +0.80 | +7.59 | +0.1 |
| Northeast Hills | +0.66 | +1.25 | +4.65 | +3.27 | +7.33 | +1.0 |
| Southwest | +2.53 | -0.01 | +1.66 | +0.15 | +1.80 | +1.2 |
| South Central | +1.19 | +4.01 | +5.67 | +1.72 | -2.44 | +0.9 |
| Southeast | +1.36 | +2.58 | +5.55 | +2.30 | +1.82 | +1.0 |
| State | +1.16 | +0.24 | +2.77 | +1.34 | +6.69 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
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-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION APRIL 1994



Average (in)

Percent of normal

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MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,922 | 134 | 117 | 122 | 100 |
| Great Miami River at Hamilton | 3,630 | 7,523 | 142 | 85 | 129 | 131 |
| Huron River at Milan | 371 | 802 | 155 | 98 | 109 | 90 |
| Killbuck Creek at Killbuck | 464 | 1,244 | 164 | 127 | 137 | 110 |
| Little Beaver Creek near East Liverpool | 496 | 1,196 | 133 | 127 | 128 | 103 |
| Maumee River at Waterville | 6,330 | 13,079 | 137 | 92 | 93 | 95 |
| Muskingum River at McConnelsville | 7,422 | 20,350 | 135 | 133 | 138 | 116 |
| Scioto River near Prospect | 567 | 1,140 | 140 | 86 | 129 | 119 |
| Scioto River at Higby | 5,131 | 11,774 | 167 | 107 | 119 | 113 |
| Stillwater River at Pleasant Hill | 503 | 832 | 116 | 66 | 143 | 145 |

STREAMFLOW during April was above normal throughout Ohio. Flows in some eastern Ohio drainage basins were high enough to be considered excessive. Flows during April were greater than the March flows in all but the northeastern area of the state.

Flows at the beginning of the month were below normal throughout Ohio. Most drainage basins in the western half of the state had their lowest flows for April just after the beginning of the month. Flows increased noticeably after April 9 following widespread precipitation. Greatest flows for April occurred sometime during the April 10-15 period for all areas of the state. Low level flooding was common in many areas during this period. Many fields had standing water. Flows declined

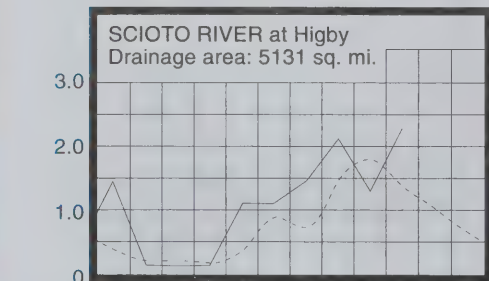
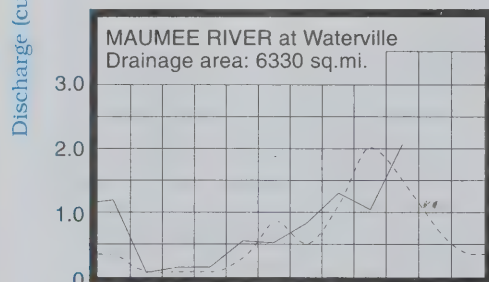
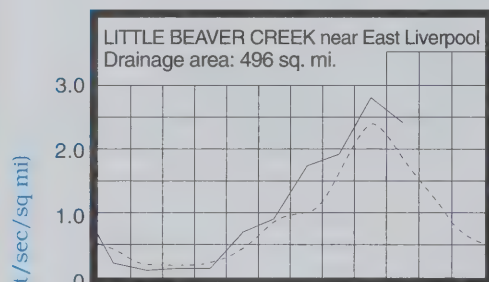
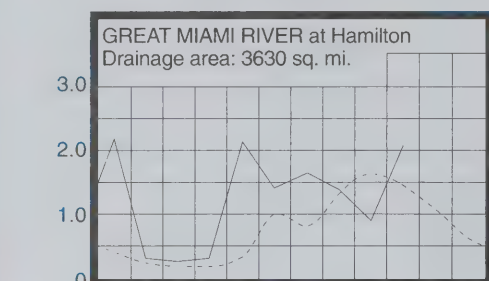
until the end of the month following these peaks with the drainage basins in the eastern half of the state recording their lowest flows for April at the end of the month. Flows were below normal statewide at the month's end.

RESERVOIR STORAGE for water supply during April increased in the Mahoning basin reservoirs and decreased slightly in the Scioto basin reservoirs. Storage remained above normal in both basins.

Reservoir storage at the end of April in the Mahoning basin index reservoirs was 101 percent of rated capacity for water supply compared with 97 percent for last month and 105 percent for April 1993. Month-end storage in the Scioto basin index reservoirs was 103 percent of rated capacity for water supply compared with 104 percent for last month and 105 percent for April 1993.

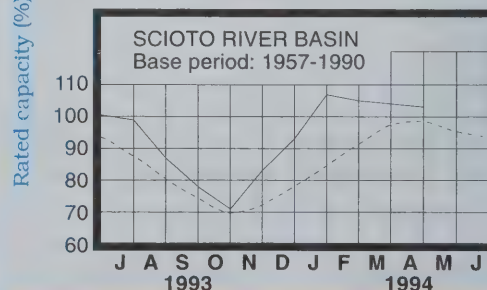
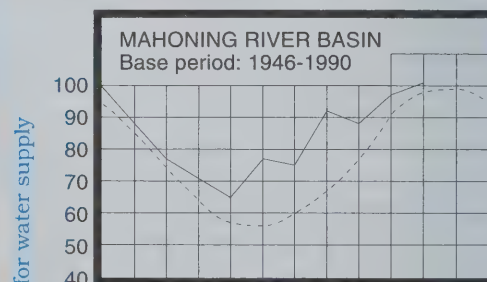
Surface-water supplies continue to remain in excellent condition throughout Ohio. Reservoirs are near capacity as the summer season approaches.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - - Current

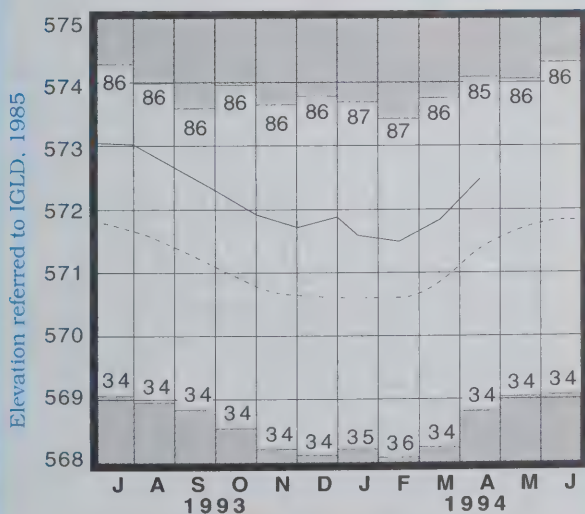
GROUND-WATER LEVELS during April rose in all aquifers throughout Ohio. In most areas, the net rise during April from the levels in March ranged from near normal to greater than usually observed. Generally, ground-water levels were stable during the first ten days of the month and then began to rise following widespread precipitation. Levels in most deeper aquifers continued to rise through the end of April while levels in most shallow aquifers declined during the last week of the month.

The above normal precipitation during April was a benefit for ground-water supplies; however, ground-water storage continues to remain at below normal levels throughout much of Ohio. Also, this year's levels are lower than last year's levels. Ample precipitation during the growing season will slow the natural rate of decline in ground-water storage, but little positive improvement can be expected. Ground-water storage is not expected to return to normal levels during the summer months. Although ground-water supplies are adequate throughout Ohio, water-supply managers with ground-water sources should monitor their situations as the summer discharge season progresses.

LAKE ERIE level rose seasonally during April. The mean level was 572.47 feet (IGLD-1985), 0.65 foot above last month's mean level and 1.08 feet above normal. This month's level is 0.73 foot lower than the April 1993 level and 3.27 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that during April, precipitation in the Lake Erie basin averaged 4.3 inches, 1.2 inches above normal. In April, the entire Great Lakes basin averaged 3.2 inches, 0.7 inch above normal. Cumulative precipitation for 1994 in the Lake Erie basin averages 10.6 inches, 0.2 inch above normal and in the entire Great Lakes basin, 8.3 inches, 0.3 inch below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

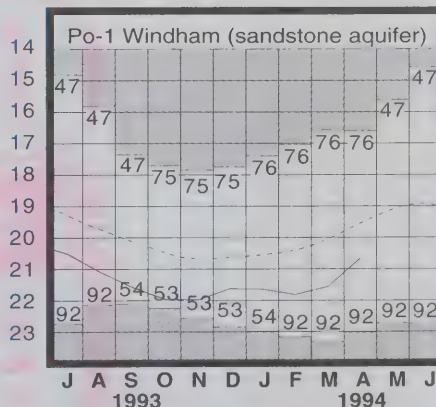
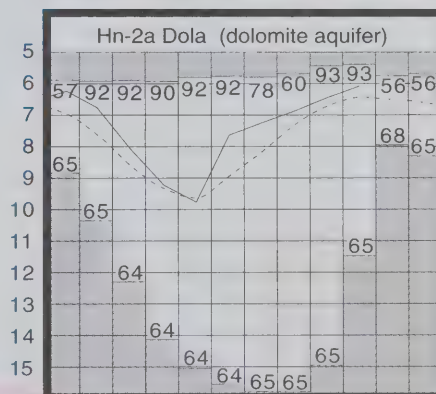
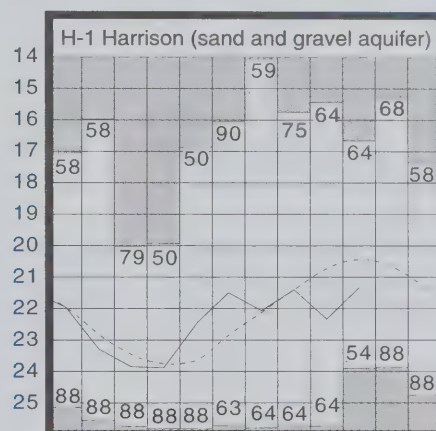
Record high and low, year of occurrence

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 12.69 | -0.26 | +1.07 | +0.40 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.16 | -0.42 | +0.13 | -0.40 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.50 | +0.90 | +0.42 | -0.60 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.32 | -0.89 | +1.01 | -0.24 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.08 | +0.39 | +0.38 | -0.31 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.66 | -1.14 | +0.90 | -0.57 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 11.61 | -0.81 | +0.90 | 0.00 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current

SUMMARY

Precipitation was above normal throughout the state. Stream-flow was above normal in all drainage basins. Reservoir storage was stable or improved slightly and remained at above normal seasonal levels. Ground-water storage improved, but remained at below normal seasonal levels in most areas of the state. Lake Erie level rose seasonally and was 1.08 feet above the long-term April average.

NOTES AND COMMENTS

DIVISION OF WATER HAS NEW LEADERSHIP

Ohio Department of Natural Resources' (ODNR) Director Frances S. Buchholzer recently announced the appointment of Michele Willis as acting chief of the Division of Water. Director Buchholzer also announced that James Morris, chief of the Division of Water since March 1992, would become chief of ODNR's Office of Real Estate and Land Management.

Mrs. Willis brings a strong professional background to the Division of Water. She worked for the Division of Water from 1985 to 1989 in the Dam Safety Section performing inspections and analyses of dams, reviewing dam rehabilitation plans and providing technical assistance for floodplain projects. In 1989 she accepted a project manager position with Woolpert Consultants (Columbus) where she was responsible for management and design of many types of water resources projects, flood insurance studies, NPDES stormwater permitting and private development master planning.

In 1992 Michele returned to ODNR as a project manager in the ODNR Office of Chief Engineer. She worked on many water resources projects and waste site closures, administered the Lake Erie shore erosion control permit program and coordinated the NPDES stormwater permits for ODNR facilities and projects.

Mrs. Willis is a registered professional engineer in Ohio. She attended The Ohio State University where she earned bachelor of science degrees in psychology and civil engineering. She is a member of the Association of State Dam Safety Officials, the American Water Resources Association and the Water Management Association of Ohio.

The entire Division of Water staff welcomes Mrs. Willis to her new position. We all look forward to working with Michele during the exciting and challenging years ahead. The Division of Water staff also thanks Jim Morris for his hard work and support and wishes him well in his new position.

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

The Ground Water Resources of Clinton County
by James J. Schmidt

The Ground Water Resources of Madison County
by Michael Hallfrisch

These maps are two in a series of county ground-water resources maps which have been completed for 86 of Ohio's 88 counties. Ground-water resources maps are prepared by staff hydrogeologists. These maps show the regional ground-water characteristics based on interpretations of water well drilling records and local geology. These color-coded maps provide well log data for many point locations. Information provided by the maps include typical depths of wells, water-bearing formations and estimated yields for wells in the area.

Ground-water resources maps can be used as a guide to locate new or expand existing ground-water supplies. The maps are useful to homeowners, ground-water consultants, engineers, planners and developers.

Ground-water resources maps cost \$5.00 each plus 5.75 % sales tax*. They can be purchased at or ordered from: ODNR Division of Water, Ground Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224. Make checks payable to ODNR Division of Water. If ordered through the mail, please include the correct postage and handling charges.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

*Out of state orders do not need to include sales tax.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

May 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION for May was below normal throughout Ohio; only a few locations in extreme southern Ohio had above normal rainfall. The state average was 2.53 inches, 1.22 inches below normal. Regional averages ranged from 3.36 inches, 0.57 inch below normal, for the South Central Region to 1.54 inches, 2.00 inches below normal, for the Northwest Region. This was the sixth driest May during the 100 years of record for the Northwest Region. Captain Anthony Meldahl Locks and Dam (Clermont County) reported the greatest amount of precipitation for the month, 4.94 inches. Painesville (Lake County) reported the least amount, 1.08 inches.

The weather during May was generally cool and dry. The first half of the month had more days with precipitation. Some spotty rain fell during the first couple days of May but the first significant storms crossed the state during May 6-7. Many areas in the southern half of Ohio received between 1 and 2 inches of rain and along the Ohio River, more than 2 inches fell. Spotty storms occurred around the state during May 8-9, but skies cleared on May 10 allowing a spectacular view of an annular solar eclipse. A few scattered showers were around the state on May 12, but for the second week of the month as a whole, most areas received only 0.5 inch of rain or less. After some scattered storms during May 14-16, the state began to really dry out. Farmers were able to plant field crops ahead of schedule. Stronger storms crossed the northern half of the state during May 24-26 with some areas reporting from about 1 inch to nearly 2 inches. A few showers developed in Ohio on the last day of the month, but most areas of the state were rather dry at the month's end.

Precipitation for the 1994 calendar year is above normal in the eastern half of Ohio and below normal in the western half. The state average is 15.43 inches, 0.21 inch below normal. Regional averages range from 22.34 inches, 4.43 inches above normal, for the South Central Region to 11.21 inches, 2.58 inches below normal, for the North Central Region.

Precipitation for the 1994 water year is above normal throughout most of Ohio but below normal in the North Central, Northwest and West Central regions. The state average is 25.22 inches, 2.01 inches above normal. Regional averages range from 31.90 inches, 6.02 inches above normal, for the South Central Region to 17.56 inches, 3.21 inches below normal, for the Northwest Region. The 1994 water year recharge season has apparently ended. Little recharge to ground water supplies during the summer months can be expected barring unusual or extreme climatic conditions.

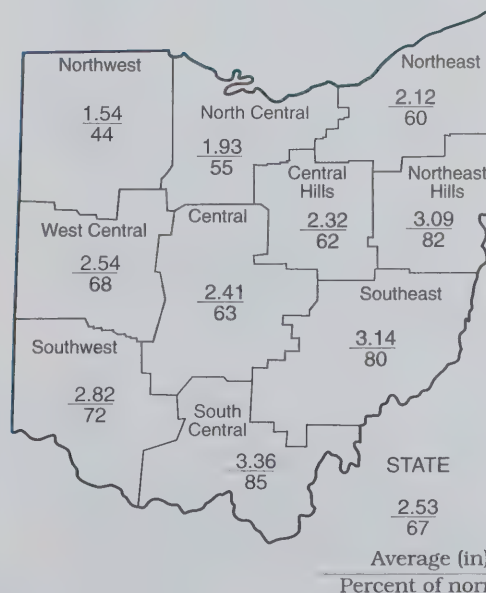
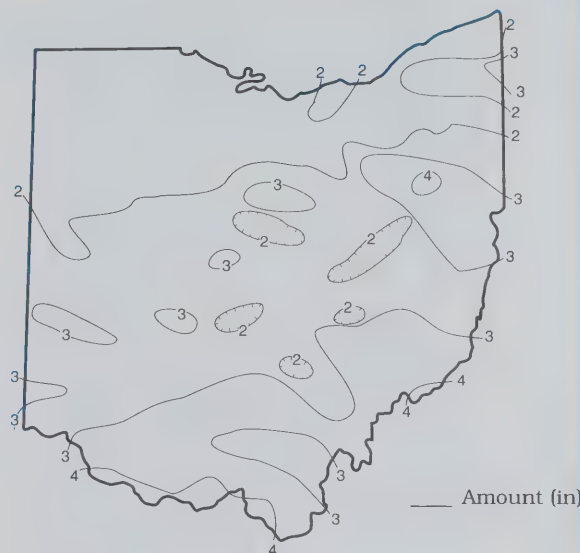
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -2.00 | -2.08 | -3.51 | -2.04 | +6.16 | -1.6 |
| North Central | -1.58 | -2.22 | -2.89 | -2.61 | +8.18 | -1.6 |
| Northeast | -1.41 | +0.40 | +0.43 | +4.80 | +14.29 | -1.2 |
| West Central | -1.18 | -3.20 | -4.08 | +3.79 | +10.27 | -1.9 |
| Central | -1.40 | -2.43 | -2.68 | +1.75 | +7.49 | -0.8 |
| Central Hills | -1.45 | -0.84 | -0.88 | +0.94 | +7.31 | -1.4 |
| Northeast Hills | -0.69 | +0.85 | +1.52 | +4.30 | +7.53 | -0.6 |
| Southwest | -1.10 | -0.33 | -1.40 | +0.04 | +1.37 | -0.5 |
| South Central | -0.57 | +2.23 | +3.69 | +2.39 | -3.36 | -0.6 |
| Southeast | -0.80 | +1.79 | +3.00 | +3.58 | +2.19 | -0.4 |
| State | -1.22 | -0.58 | -0.67 | +1.71 | +6.16 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION MAY 1994



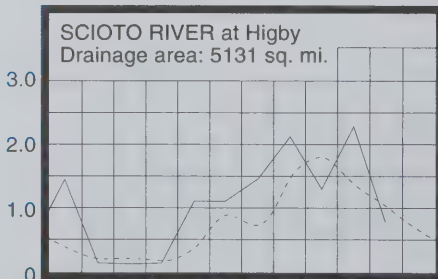
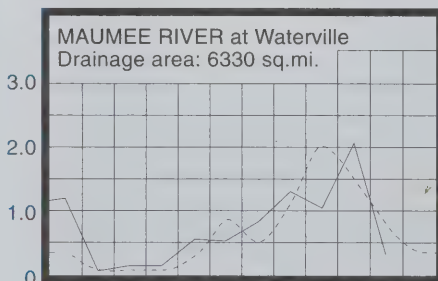
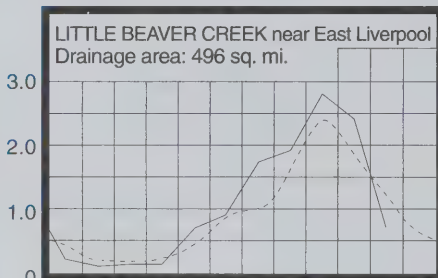
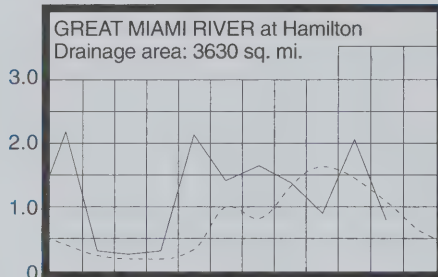
MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 175 | 28 | 101 | 107 | 100 |
| Great Miami River at Hamilton | 3,630 | 2,882 | 74 | 73 | 97 | 131 |
| Huron River at Milan | 371 | 54 | 20 | 77 | 88 | 90 |
| Killbuck Creek at Killbuck | 464 | 277 | 56 | 106 | 118 | 106 |
| Little Beaver Creek near East Liverpool | 496 | 353 | 61 | 103 | 119 | 102 |
| Maumee River at Waterville | 6,330 | 1,936 | 38 | 80 | 83 | 94 |
| Muskingum River at McConnelsville | 7,422 | 5,510 | 56 | 99 | 115 | 113 |
| Scioto River near Prospect | 567 | 127 | 30 | 74 | 96 | 118 |
| Scioto River at Higby | 5,131 | 3,972 | 75 | 90 | 108 | 113 |
| Stillwater River at Pleasant Hill | 503 | 197 | 51 | 58 | 87 | 143 |

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

Normal - - - - Current ———

STREAMFLOW during May was noticeably below normal throughout Ohio. Flows in most northern and western Ohio drainage basins were low enough to be considered deficient. Flows during May were considerably less than the flows during April.

Flows at the beginning of the month were below normal in most areas of Ohio; some basins in southwestern Ohio started the month with slightly above normal flows responding to a few scattered, locally severe storms at the end of April. Most drainage basins had their greatest flows for May at or near the beginning of the month. A few exceptions were noted where flows were slightly greater than those at the beginning of the month following local storms.

Generally, flows declined throughout the month with the lowest flows for May occurring at or near the month's end. Flows at the end of May were deficient statewide, a response to the noticeably below normal precipitation.

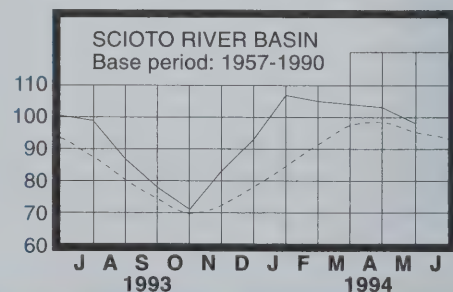
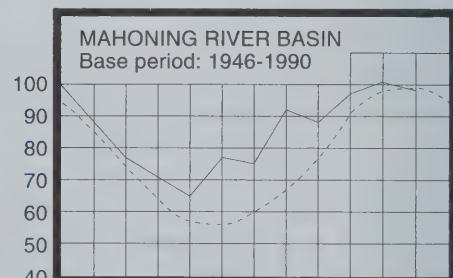
RESERVOIR STORAGE for water supply during May declined in both the Mahoning and Scioto river basins. Storage remained slightly above normal in the Scioto basin reservoirs but fell to slightly below normal in the Mahoning basin reservoirs.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 98 percent of rated capacity for water supply compared with 101 percent for last month and 97 percent for May 1993. Month-end storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared with 103 percent for last month and 99 percent for May 1993.

Surface water supplies continue to remain adequate throughout Ohio in spite of the below normal precipitation that fell during May. Storage in both on- and off-stream reservoirs is at near normal seasonal levels.

RESERVOIR STORAGE FOR WATER SUPPLY

Rated capacity (%) for water supply



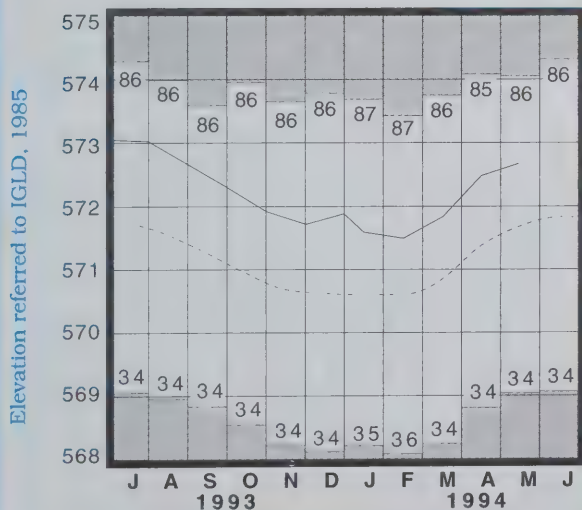
GROUND WATER LEVELS

during May declined in most of Ohio's aquifers; a few exceptions were noted in some deeper aquifers, especially consolidated aquifers, where levels were stable or rose slightly responding to delayed recharge from the above normal precipitation in April. Generally, ground water levels declined throughout the month except as noted above. In most areas, the net declines recorded during May were greater than usually observed.

With the below normal precipitation in May, the 1994 water year ground water recharge season has come to an end. Little recharge can be expected during the summer months; however, ample precipitation can be a benefit for agriculture and possibly reduce the rate of decline in many aquifers. The 1994 recharge season was not especially good for ground water supplies as levels in most aquifers, especially those in the eastern half of the state, did not return to normal levels. Current levels are lower than the levels of May 1993 in nearly all areas of the state. Ground water storage is at below normal levels in most areas of the state with the greatest departures, nearly 2 feet below normal, being in the eastern half of Ohio. Although ground water supplies are adequate throughout Ohio, water supply managers with ground water sources should closely monitor their situations throughout the summer and fall months.

LAKE ERIE level rose seasonally during May. The mean level was 572.67 feet (IGLD-1985), 0.20 foot above last month's mean level and 0.98 foot above normal. This month's level is 0.43 foot lower than the May 1993 level and 3.47 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

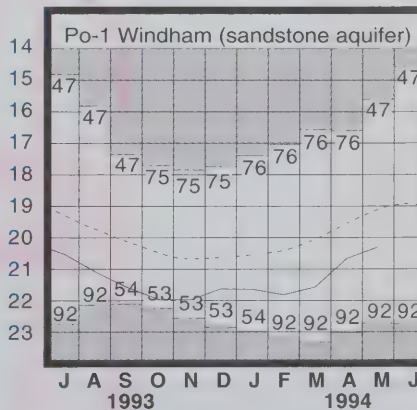
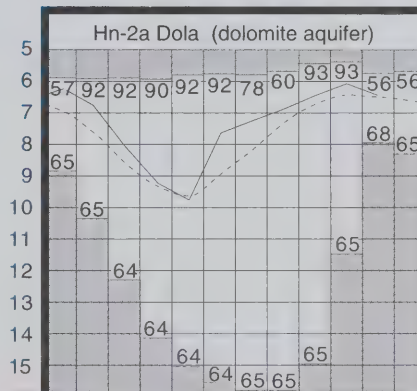
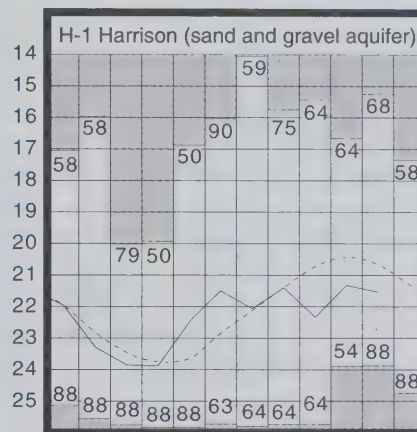
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.55 | -1.83 | -1.86 | -0.51 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.31 | -0.29 | -0.15 | -0.34 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.36 | +1.27 | +0.14 | -0.69 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.55 | -0.87 | -0.23 | +0.12 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.47 | +0.06 | -0.39 | -0.20 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.30 | -1.21 | +0.36 | -0.36 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.23 | -1.10 | -0.62 | -0.05 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current

SUMMARY

Precipitation was below normal throughout Ohio. Streamflow was noticeably below normal statewide. Reservoir storage declined but remained near normal seasonal levels. Ground water levels declined in most aquifers and are below normal in most areas of the state. Lake Erie level rose seasonally and was 0.98 foot above the long-term May average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Medina County
by Michael P. Angle

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. This map uses the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the map, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Ground Water Pollution Potential maps cost \$10.00 each plus 5.75% sales tax*. They can be purchased at or ordered from: ODNR Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224. Make checks payable to ODNR Division of Water. If ordered through the mail, please include the correct postage and handling charges.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

*Out of state orders do not need to include sales tax.

DIVISION OF WATER NOW ACCEPTS VISA AND MASTERCARD

Effective July 1, 1994, the Division of Water will no longer be invoicing for publications or photocopying. Prepayment will be required by check, MasterCard or Visa. Checks should be made payable to ODNR Division of Water. Walk-in customers may use cash (please do not send cash in the mail). Receipts will be mailed showing purchased items and payment method.

In order for us to provide prompt service, please add the correct tax, postage and handling charges when prepaying by check.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conserancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

June 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

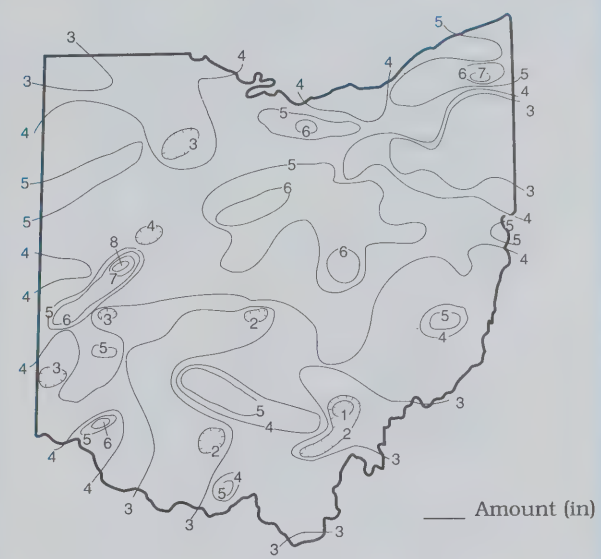
PRECIPITATION for June was generally above normal in the northern half of Ohio and below normal in the southern half. The state average was 4.13 inches, 0.17 inch above normal. Regional averages ranged from 5.07 inches, 0.96 inch above normal, for the Central Hills Region to 3.27 inches, 0.61 inch below normal, for the South Central Region. Sidney (Shelby County) reported the greatest amount of precipitation for the month, 8.18 inches. Athens (Athens County) reported the least rain in June, 0.68 inch.

Rainfall during June varied greatly between the first and second halves of the month. The dry conditions that started about the middle of May across most of Ohio not only continued, but worsened during the first half of June. Most areas of the state received less than 0.5 inch of precipitation during the first half of the month; a few exceptions were noted in some southern and southeastern areas where more than 1 inch of rain fell in scattered storms on June 6-7. Some locations reported less than 0.1 inch of rain during the first half of June. Concerns about drought prompted action by state and federal agencies. Farmers were very concerned about crops. Fortunately, showers began to cross Ohio after mid-month. Although widely scattered at first, as the month progressed most areas of the state received much needed rain. The last ten days of the month were the wettest for most areas in Ohio. Showers and thunderstorms were widespread. Many of these storms were locally severe producing hail, high winds and rain amounts of up to 4 inches. Most locations in Ohio received about 90 percent of their June precipitation during the last ten days of the month. At the end of June, soil moisture was reported as being adequate in 78 percent of Ohio, surplus in 10 percent of the state and short in 12 percent. The rains may have saved agricultural crops. Yields are expected to be about average if favorable growing conditions continue.

Precipitation for the first half of the 1994 calendar year is generally above normal in the eastern half of Ohio and below normal in the western half. The state average is 19.56 inches, 0.03 inch below normal. Regional averages range from 25.61 inches, 3.82 inches above normal, for the South Central Region to 14.96 inches, 2.61 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past six months column).

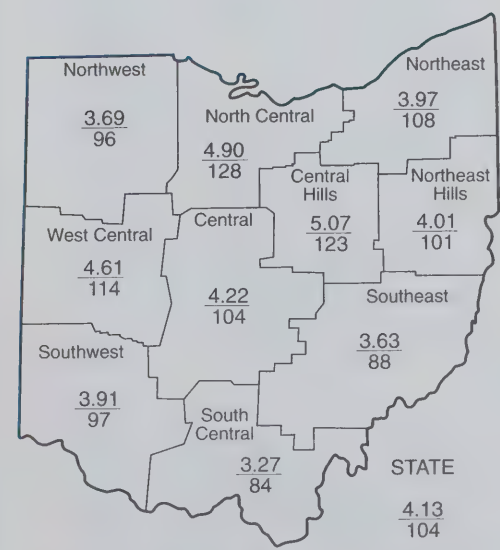
Precipitation for the 1994 water year is above normal throughout most of Ohio with only the Northwest Region having below normal precipitation. The state average is 29.35 inches, 2.18 inches above normal. Regional averages range from 35.17 inches, 5.41 inches above normal, for the South Central Region to 21.25 inches, 3.35 inches below normal, for the Northwest Region.

PRECIPITATION JUNE 1994



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.14 | -0.80 | -2.61 | -3.27 | +7.38 | -1.9 |
| North Central | +1.08 | +0.24 | -1.50 | -2.00 | +10.32 | -2.2 |
| Northeast | +0.29 | +0.86 | +0.75 | +2.84 | +16.47 | -1.7 |
| West Central | +0.57 | -0.56 | -3.12 | +3.13 | +10.71 | -1.3 |
| Central | +0.16 | -0.96 | -2.09 | +1.17 | +8.76 | +0.2 |
| Central Hills | +0.96 | +0.92 | +0.26 | +0.82 | +9.90 | -1.4 |
| Northeast Hills | +0.05 | +0.02 | +1.90 | +3.96 | +10.25 | -1.9 |
| Southwest | -0.14 | +1.29 | -0.97 | -0.48 | +2.01 | -1.4 |
| South Central | -0.61 | +0.01 | +3.82 | +1.96 | -3.54 | -1.3 |
| Southeast | -0.51 | +0.05 | +3.15 | +3.64 | +3.36 | -1.2 |
| State | +0.17 | +0.11 | -0.03 | +1.19 | +7.58 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

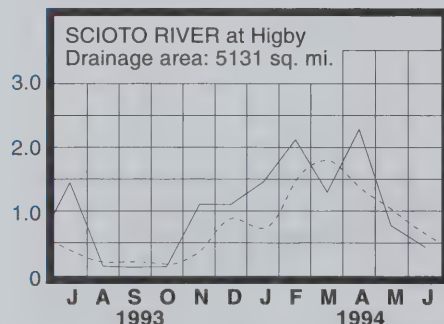
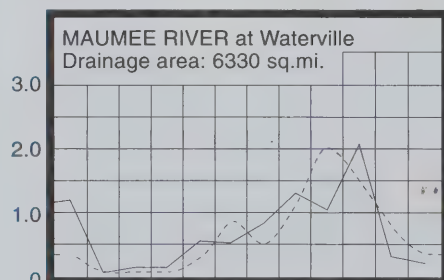
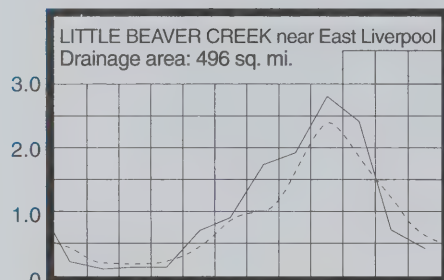
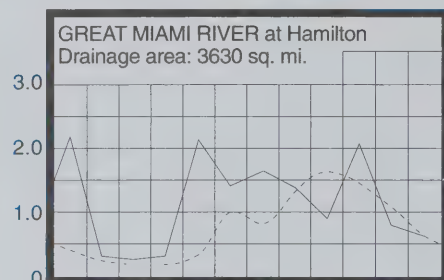
MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 197 | 76 | 88 | 103 | 96 |
| Great Miami River at Hamilton | 3,630 | 2,322 | 100 | 91 | 92 | 129 |
| Huron River at Milan | 371 | 200 | 116 | 102 | 89 | 88 |
| Killbuck Creek at Killbuck | 464 | 155 | 59 | 97 | 106 | 103 |
| Little Beaver Creek near East Liverpool | 496 | 201 | 64 | 85 | 115 | 96 |
| Maumee River at Waterville | 6,330 | 1,239 | 54 | 78 | 81 | 85 |
| Muskingum River at McConnelsville | 7,422 | 2,858 | 48 | 86 | 107 | 111 |
| Scioto River near Prospect | 567 | 320 | 120 | 86 | 84 | 121 |
| Scioto River at Higby | 5,131 | 2,188 | 63 | 90 | 95 | 113 |
| Stillwater River at Pleasant Hill | 503 | 107 | 40 | 65 | 76 | 137 |

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

STREAMFLOW during June was below normal in most areas of Ohio, but above normal in the north-central area of the state. Flows in the north-western and southeastern areas of Ohio were low enough to be considered deficient. Flows during June were less than the flows during May except in north-central and extreme northeastern Ohio drainage basins where they were slightly greater.

Flows at the beginning of the month were noticeably below normal statewide. Generally, flows declined until a few days after mid-month. Most drainage basins recorded their lowest flows for the month during June 17-20. Flows in most areas of the state were at markedly low levels during this period. Flows began to increase as showers

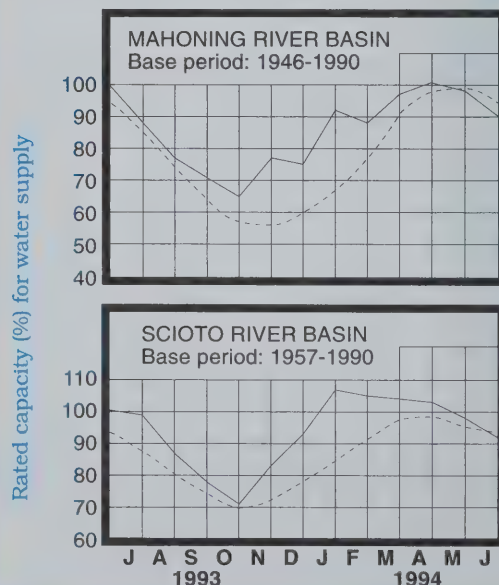
and thunderstorms began to cross the state. Most drainage basins had their greatest flows for the month during June 27-30 following widespread precipitation on June 26. By the end of June, flows had improved to above normal levels.

RESERVOIR STORAGE for water supply during June decreased in both the Mahoning and Scioto river basins. Storage at the end of the month was slightly below normal in both basins.

Reservoir storage at the end of June in the Mahoning basin index reservoirs was 90 percent of rated capacity for water supply compared with 98 percent for last month and 100 percent for June 1993. Month-end storage in the Scioto basin index reservoirs was 92 percent of rated capacity for water supply compared with 98 percent for last month and 101 percent for June 1993.

Lakes and reservoirs throughout Ohio are at or near normal seasonal levels. Water supply reservoir levels are only slightly below normal for this time of year. The below normal rainfall and resulting reduced streamflow, high temperatures and increased demand all combined to raise concerns about potential public water supply surface sources throughout Ohio; however, the rains during the last ten days of June helped ease these concerns. At the end of June, surface water supplies are at favorable levels throughout the state.

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

during June declined in all aquifers throughout Ohio. The dry conditions of late May and early June resulted in net declines during June in ground water storage of two to four times that usually observed. Ground-water levels declined steadily throughout June in most aquifers. A few exceptions were noted in some shallow aquifers where levels stabilized or rose slightly during the last week of the month.

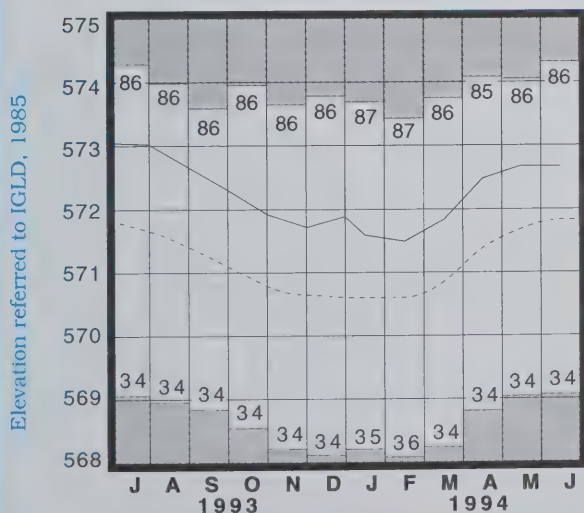
Ground-water storage is at below normal seasonal levels throughout Ohio. Levels generally range from between 0.5 and 3 feet below normal with the eastern half of the state having the greatest deficits. These current levels are not near the June record-low levels; however, the current levels are lower than the June 1993 levels. Normal or near-normal precipitation during the summer and fall months will be needed to keep levels from approaching the historic lowest levels, especially in the eastern half of the state.

Ground-water supplies remain adequate throughout Ohio. Recent rains offered some improvement in soil moisture; however, little recharge to aquifers can be expected until late fall or early winter. Water supply managers with ground water sources are encouraged to closely monitor their situations until adequate recharge has been observed.

LAKE ERIE level was stable during June. The mean level was 572.67 feet (IGLD-1985), the same as last month and 0.85 foot above normal. This month's level is 0.39 foot lower than the June 1993 level and 3.47 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during June averaged 4.2 inches, 0.8 inch above normal. The entire Great Lakes basin averaged 3.5 inches of rain in June, 0.3 inch above normal. For the first six months of 1994, the Lake Erie basin has received an average of 16.9 inches of precipitation, 0.1 inch below normal. For the same period, the entire Great Lakes basin has averaged 14.3 inches, 0.5 inch below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

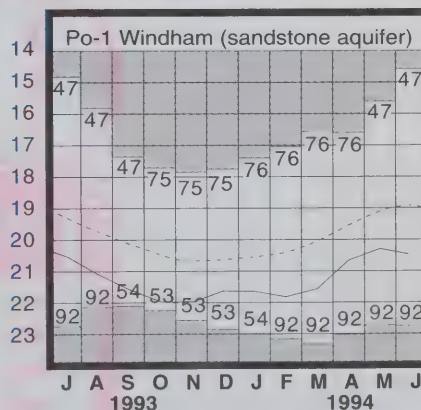
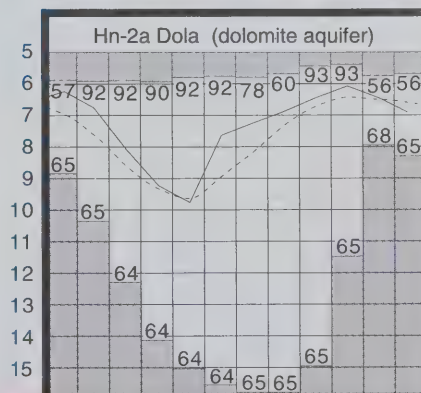
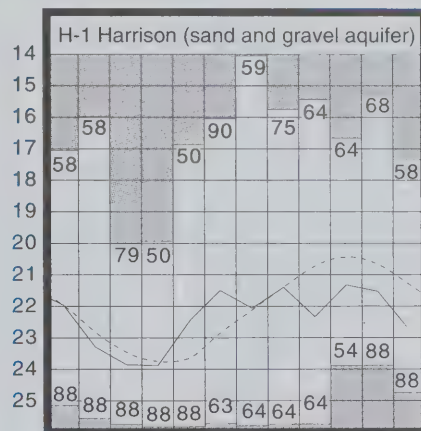
Normal - - - - Current

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 16.75 | -2.84 | -2.20 | -0.17 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.94 | -0.57 | -0.63 | -0.43 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.58 | +0.47 | -1.22 | -0.97 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.66 | -1.36 | -1.11 | -1.07 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.92 | -0.29 | -0.45 | -0.40 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.47 | -1.55 | -0.17 | -0.32 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.67 | -1.78 | -1.44 | -0.26 |

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Record high and low, year of occurrence

Water level (ft below land surface)

SUMMARY

Precipitation was generally above normal in the northern half of the state and below normal in the southern half. Most of the rain fell after mid-month. Streamflow was below normal in most areas but above normal in the north-central drainage basins. Reservoir storage declined, but was only slightly below normal. Ground-water levels declined and are below normal throughout the state. Lake Erie level was unchanged from last month and was 0.85 foot above the long-term June average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Erie County

by Kelly C. Smith, ERM-Midwest, in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground-Water Pollution Potential of Geauga County

by Linda Aller and Karen L. Ballou, Geodesy, Inc., in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Ground Water Pollution Potential maps and the accompanying report cost \$10.00 each. They can be purchased at or ordered from: ODNR Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224. Make checks payable to ODNR Division of Water. If ordered through the mail, please include the correct postage and handling charges. Visa or MasterCard can be used for payment.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

OHIO COMPARATIVE RISK PROJECT

Comparative risk is a planning process that combines scientific assessment of risk with public values to produce environmental priorities. Ohio's project will go beyond just producing a priority list. It also will develop action strategies for policymakers and individuals to use in reducing risk. The process will focus on consensus-building and teamwork to accomplish the overall goal of creating an environmental decision-making tool.

There are four working groups involved in the project. Three technical groups will estimate human health, ecosystem and quality-of-life risks from the identified issues. The fourth working group, the public advisory group, will be responsible for coordinating public outreach and integrating scientific assessments with information about public values.

The State Agency Advisory Group, made up of heads of state agencies, will serve to advise and guide the public advisory group. Sally Prouty, ODNR Deputy Director for Resource Management, will represent ODNR Director Frances S. Buchholzer at the advisory group meetings.

The results of the project will include a State of the Environment Report and two action agendas, one for policymakers and one for individuals. All of the documents will provide valuable information to be used in long-range strategic planning.

For more information about the Ohio Comparative Risk Project, contact Michele Morrone, Ph.D., Ohio Comparative Risk Project, P. O. Box 163669, Columbus, Ohio 43216-3669, phone: (614) 644-3638.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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OHIO STATE WATER SUPPLY DIV.
2204 EASTERN BLVD.
COLUMBUS, OH 43224



MONTHLY WATER INVENTORY REPORT FOR OHIO

July 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION for July was below normal throughout most of Ohio but above normal in scattered locations, especially in the south-central and southeastern areas of the state. The state average was 3.65 inches, 0.27 inch below normal. Regional averages ranged from 5.38 inches, 1.01 inches above normal, for the Southeast Region to 2.56 inches, 0.90 inch below normal, for the North Central Region. Senecaville Lake (Noble County) reported the greatest amount of precipitation for the month, 8.59 inches; Racine Locks and Dam (Meigs County) reported 8.01 inches of rain in July. Wauseon (Fulton County) reported the least amount of July precipitation, 1.27 inches.

Rainfall during July was evenly distributed throughout the month although some of the larger storms occurred during the first half of the month. The rain fell in typical summer fashion as scattered showers and isolated, locally severe thunderstorms. Small stream and urban flooding was reported following some of these storms. Storm periods during the month included July 2-3, 7-9, 13-14, 21-22, 25 and 29. Rainfall amounts varied widely during each storm period often with less than 0.5 inch totals but ranging up to more than 2 inches at some locations. At the end of July, soil moisture was reported as being adequate in 78 percent of Ohio, surplus in 5 percent and short in 17 percent of the state.

Precipitation for the 1994 calendar year is generally below normal in the western half of the state and above normal in the eastern half. The state average is 23.21 inches, 0.31 inch below normal. Regional averages range from 30.26 inches, 4.01 inches above normal, for the South Central Region to 17.74 inches, 3.27 inches below normal, for the Northwest Region.

Precipitation for the 1994 water year is above normal throughout most of Ohio but below normal in the Northwest, North Central and West Central regions. The state average is 33.00 inches, 1.91 inches above normal. Regional averages range from 39.82 inches, 5.60 inches above normal, for the South Central Region to 24.03 inches, 4.01 inches below normal, for the Northwest Region.

PRECIPITATION JULY 1994

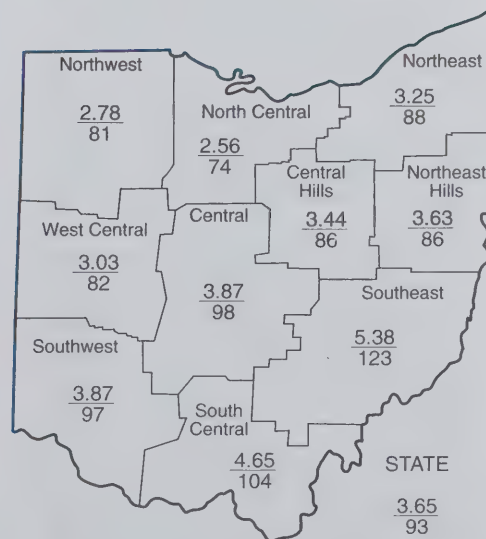


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.66 | -2.80 | -3.52 | -3.54 | +3.03 | -3.0 |
| North Central | -0.90 | -1.40 | -2.88 | -1.46 | +4.18 | -3.2 |
| Northeast | -0.43 | -1.55 | -0.55 | +3.57 | +10.35 | -2.7 |
| West Central | -0.68 | -1.29 | -4.05 | -0.85 | +3.90 | -0.7 |
| Central | -0.09 | -1.33 | -2.90 | -0.94 | +2.10 | +0.1 |
| Central Hills | -0.55 | -1.04 | -0.98 | +0.64 | +2.89 | -2.8 |
| Northeast Hills | -0.58 | -1.22 | +0.03 | +3.23 | +5.19 | -2.9 |
| Southwest | -0.10 | -1.34 | -1.35 | +0.29 | -2.07 | -1.6 |
| South Central | +0.19 | -0.99 | +3.02 | +3.36 | -4.82 | -1.6 |
| Southeast | +1.01 | -0.30 | +2.28 | +5.08 | -0.01 | -1.2 |
| State | -0.27 | -1.32 | -1.08 | +0.95 | +2.50 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 252 | 88 | 42 | 96 | 98 |
| Great Miami River at Hamilton | 3,630 | 1,382 | 94 | 79 | 81 | 113 |
| Huron River at Milan | 371 | 35 | 48 | 49 | 83 | 88 |
| Killbuck Creek at Killbuck | 464 | 174 | 96 | 55 | 95 | 102 |
| Little Beaver Creek near East Liverpool | 496 | 134 | 64 | 50 | 98 | 96 |
| Maumee River at Waterville | 6,330 | 1,609 | 72 | 45 | 76 | 75 |
| Muskingum River at McConnelsville | 7,422 | 3,513 | 81 | 58 | 105 | 109 |
| Scioto River near Prospect | 567 | 450 | 441 | 90 | 77 | 115 |
| Scioto River at Higby | 5,131 | 3,916 | 196 | 91 | 93 | 106 |
| Stillwater River at Pleasant Hill | 503 | 139 | 101 | 49 | 65 | 115 |

STREAMFLOW during July was below normal throughout most of Ohio. The exception was in the central part of the state where flows were above normal. Flows in the Scioto River basin were high enough to be considered excessive. Generally, flows during July were greater than the flows recorded during June.

Flows at the beginning of July were above normal throughout Ohio as a result of the widespread rain during the last ten days of June. Most drainage basins recorded their greatest flows for July at the beginning of the month and the remaining basins later in the first week as showers and thunderstorms continued to cross the state. After these peak flows, flows declined steadily through the end of the month

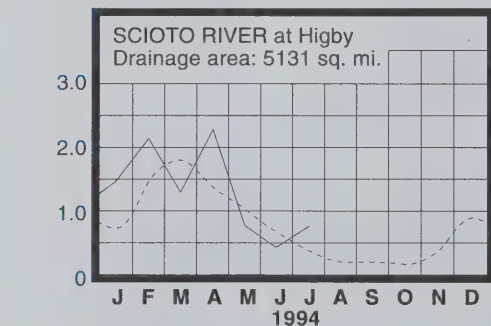
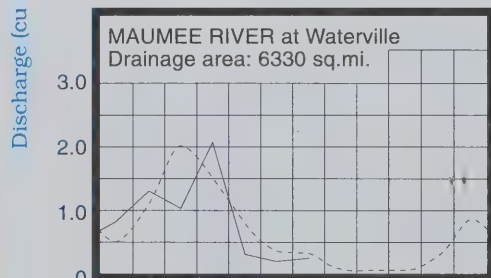
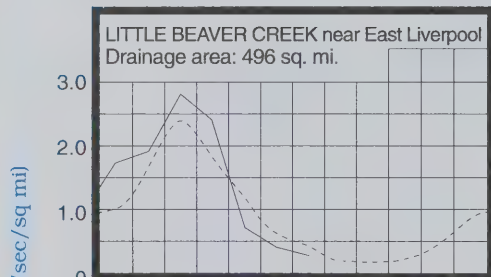
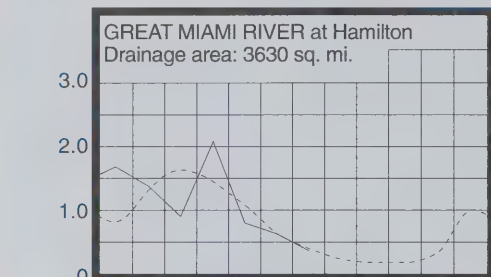
with slight rises noted following local precipitation. The lowest flows for July occurred during the last week, generally occurring around July 23 or July 29. Flows at the end of the month were below normal throughout most of the state except in the Scioto River basin where flows were noticeably above normal.

RESERVOIR STORAGE for water supply during July decreased in both the Mahoning and Scioto river basins. Storage at the end of the month was below normal in both basins.

Reservoir storage at the end of July in the Mahoning basin index reservoirs was 81 percent of rated capacity for water supply compared with 90 percent for last month and 89 percent for July 1993. Month-end storage in the Scioto basin index reservoirs was 86 percent of rated capacity for water supply compared with 92 percent for last month and 99 percent for July 1993.

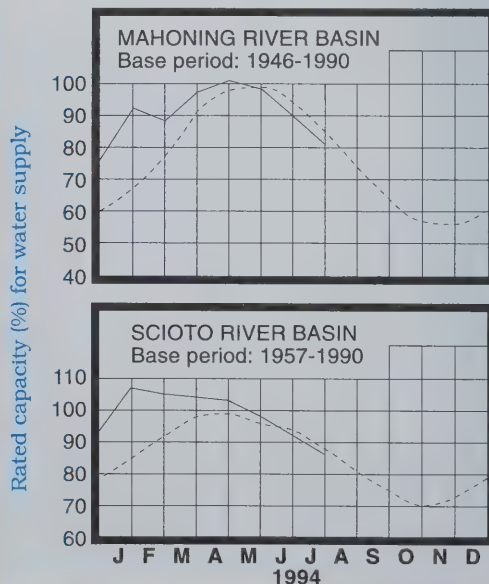
Surface water supplies throughout Ohio continue to remain at near or slightly below normal seasonal levels. Storage in both on- and off-stream reservoirs continues to decline seasonally. Recreational lakes and reservoirs are also near normal summer pool elevations. In general, surface water supplies are at favorable levels throughout the state.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND WATER LEVELS during July declined in most aquifers throughout Ohio. A few exceptions were noted where levels locally were stable or rose slightly during the month in response to heavy rain just prior to the end of June and ample precipitation during July. In most aquifers, ground water levels slowly declined throughout the month or were stable during the early part of July before beginning to decline. Generally, the net declines during July from the levels recorded in June were less than usually observed.

Ground water storage continues to remain at below normal seasonal levels throughout most of Ohio; a few aquifers in central and portions of northwestern Ohio are at slightly above normal levels. Aquifers in the eastern half of Ohio continue to have the greatest departures from normal with levels ranging up to nearly 3 feet below normal. Current levels range up to 1 foot lower than the levels of July 1993, but generally are not approaching any record-low levels.

Ground water supplies continue to remain adequate throughout Ohio. Water supply managers with ground water sources are encouraged to continue monitoring their specific situations through the upcoming fall and winter months.

LAKE ERIE level rose during July. The mean level was 572.83 feet (IGLD-1985), 0.16 foot above last month's mean level and 1.08 feet above normal. This month's level is 0.20 foot lower than the July 1993 level and 3.63 feet above Low Water Datum.

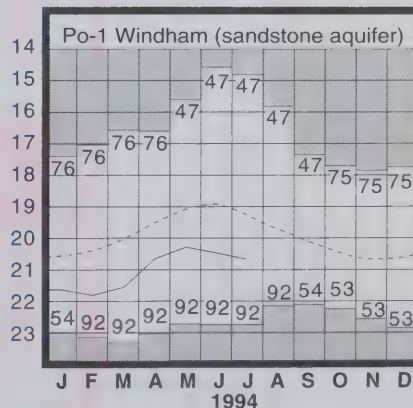
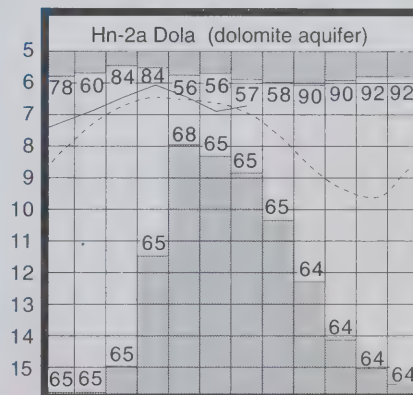
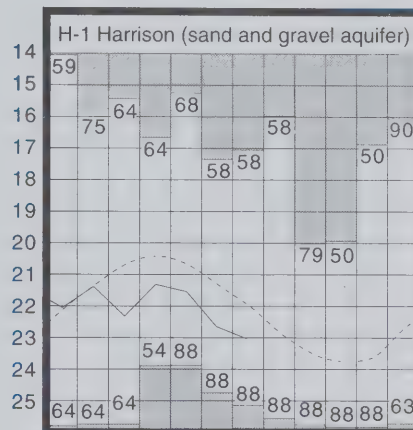
The U. S. Army Corps of Engineers' forecast indicates that Lake Erie is expected to remain above the long-term average through the end of 1994. Levels are expected to average about 1 foot above normal with a projected possible range from just above normal to nearly 1.5 feet above the long-term average.

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

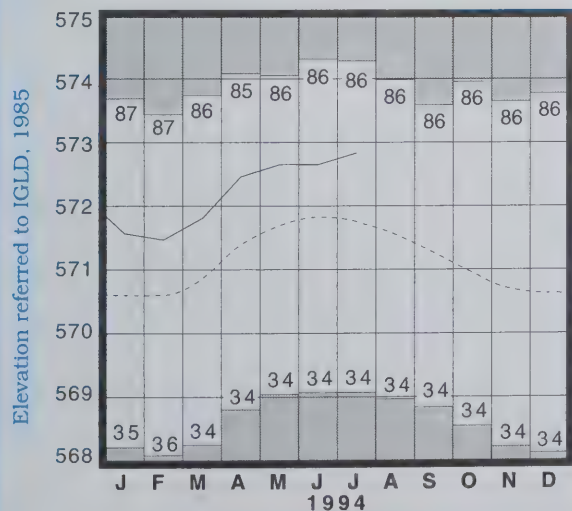
| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.84 | -2.72 | -1.09 | -0.24 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.17 | -0.37 | -0.23 | -0.31 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.96 | +0.50 | -0.38 | -0.76 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.04 | -1.08 | -0.38 | -1.01 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.73 | +0.22 | +0.19 | -0.52 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.64 | -1.40 | -0.22 | -0.17 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.38 | -1.86 | -0.71 | -0.28 |

GROUND-WATER LEVELS



Water level (ft below land surface)

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current

SUMMARY

Precipitation during July was below normal in most of Ohio but above normal in the South Central and Southeast regions. Streamflow was below normal except in the central Ohio drainage basins. Reservoir storage declined seasonally and was at below normal levels at the end of July. Ground water levels declined in most areas and were below normal in most aquifers in Ohio. Lake Erie level rose and was 1.08 feet above the long-term July average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Cuyahoga County

by Douglas J. Barber

Ground Water Pollution Potential of Ottawa County

by Kelly C. Smith, ERM-Midwest, Inc., in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground Water Pollution Potential of Seneca County

by Kelly C. Smith and John Voytek, ERM-Midwest, Inc., in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground Water Pollution Potential of Wood County

by Kelly C. Smith and Thomas P. Sabol, ERM-Midwest, Inc., in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Ground Water Pollution Potential maps and the accompanying report cost \$10.00 each. They can be purchased at or ordered from: ODNR Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224. Make checks payable to ODNR Division of Water. If ordered through the mail, please include the correct postage and handling charges. Visa or MasterCard can be used for payment.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

WATER WITHDRAWAL ANNUAL REPORT AVAILABLE

The "Ohio Water Withdrawal Facility Registration Program: 1993" annual report pamphlet is now available. This four-page report depicts on a statewide basis the amount of water withdrawn by registered facilities in 1993. It also details on a county basis the water withdrawals for each of the five reporting categories. Those categories are: power; public water supply; industrial; agriculture/irrigation (includes golf courses); and miscellaneous.

Substitute H. B. 662 (1988) requires the Ohio Department of Natural Resources Division of Water to establish a Water Withdrawal Facility Registration Program. Owners of all facilities (surface and/or ground water) with the capacity to withdraw 100,000 gallons of water or more per day are required to register that facility and submit annual reports of actual withdrawals pursuant to Section 1521.16 of the Ohio Revised Code.

Copies of the 1993 annual report are available from the Ohio Department of Natural Resources Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224-1336, phone (614) 265-6735.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

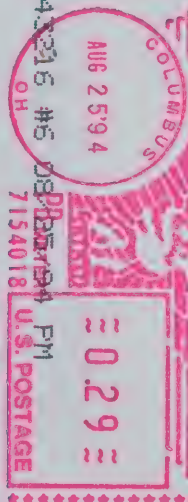
George V. Volnovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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COLUMBUS, OHIO 43224



Aug. 1994



MONTHLY WATER INVENTORY REPORT FOR OHIO

186

August 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

ILLINOIS STATE WATER SURVEY LIBRARY COPY

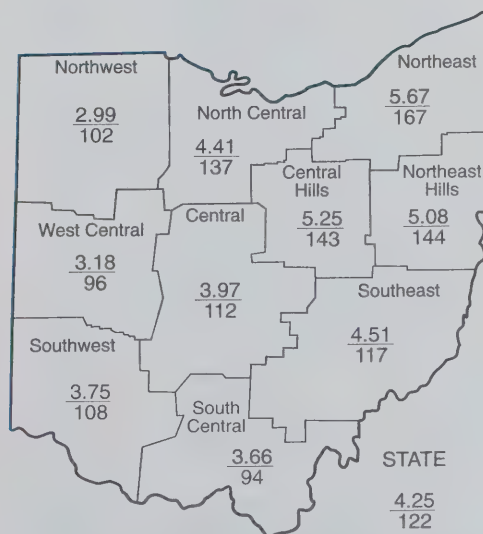
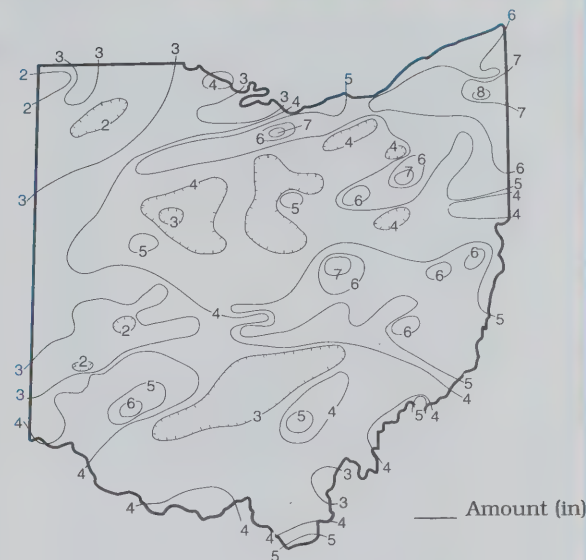
PRECIPITATION for August was above normal throughout most of Ohio; pockets of areas in south-central, west-central and north-western Ohio had below normal precipitation. The state average was 4.25 inches, 0.77 inch above normal. Regional averages ranged from 5.67 inches, 2.27 inches above normal, for the Northeast Region to 2.99 inches, 0.06 inch above normal, for the Northwest. Mosquito Creek Wildlife Area (Trumbull County) reported the least amount of precipitation during August, 8.74 inches of which 5.69 inches was observed on August 13 and 1.50 inches on August 14. Other locations reporting more than seven inches of precipitation in August were: Akron-Canton Airport (Summit County), 7.54 inches; Colebrook (Ashtabula County), 7.33 inches; Mohawk Dam (Coshocton County), 7.30 inches; and Norwalk (Huron County), 7.89 inches. New Carlisle (Clark County) reported the least amount of rain in August, only 1.37 inches. A few other locations in extreme north-western Ohio also reported less than two inches of precipitation during August.

Precipitation during August fell as showers and thunderstorms typical of the season. Locally severe storms with heavy precipitation were reported in many areas. Most areas of the state received some rain during every week of the month. During the first week of the month, storms developed during August 2 and 4-5. Most areas of Ohio received around 1 inch of rain from these storms, much less in northwestern Ohio but more than 2 inches in parts of eastern Ohio. Unusually heavy rain fell in northeastern Ohio and parts of central Ohio during August 13-14. Between 3 and 4 inches of rain was observed at many locations in these areas with unofficial readings of nearly 7 inches reported. Urban and small stream flooding, especially in northeastern Ohio, was widespread in several counties. Rainfall amounts tapered to near zero in southern Ohio during this period. Storms continued to cross the state during the second half of August. Storms during August 20-21, 28 and 31 were more typical with 0.5 inch rain amounts during each storm period common, ranging up to 1.5 inches at some locations.

Precipitation for the 1994 calendar year is generally below normal in the western half of the state and above normal in the eastern half. The state average is 27.43 inches, 0.43 inch above normal. Regional averages range from 33.86 inches, 3.72 inches above normal, for the South Central Region to 20.75 inches, 3.19 inches below normal, for the Northwest Region.

(continued on back)

PRECIPITATION AUGUST 1994



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.06 | -0.65 | -2.80 | -2.16 | +2.92 | -1.5 |
| North Central | +1.18 | +1.28 | -0.86 | +2.20 | +4.35 | -3.1 |
| Northeast | +2.27 | +2.13 | +2.53 | +7.63 | +10.85 | +0.7 |
| West Central | -0.12 | -0.23 | -3.39 | +0.33 | +3.59 | +1.2 |
| Central | +0.42 | +0.49 | -1.81 | +1.92 | +2.37 | +0.4 |
| Central Hills | +1.59 | +2.00 | +1.16 | +5.12 | +4.43 | -1.6 |
| Northeast Hills | +1.56 | +1.13 | +2.02 | +7.32 | +5.76 | -0.1 |
| Southwest | +0.28 | +0.04 | -0.25 | +1.47 | -1.76 | -0.3 |
| South Central | -0.23 | -0.64 | +1.65 | +5.49 | -4.29 | -0.6 |
| Southeast | +0.67 | +1.07 | +2.40 | +7.09 | +0.75 | -0.4 |
| State | +0.77 | +0.67 | +0.08 | +3.66 | +2.93 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 709 | 633 | 104 | 91 | 104 |
| Great Miami River at Hamilton | 3,630 | 911 | 98 | 88 | 74 | 112 |
| Huron River at Milan | 371 | 185 | 385 | 121 | 82 | 93 |
| Killbuck Creek at Killbuck | 464 | 139 | 109 | 70 | 92 | 104 |
| Little Beaver Creek near East Liverpool | 496 | 176 | 169 | 77 | 91 | 99 |
| Maumee River at Waterville | 6,330 | 629 | 94 | 63 | 72 | 75 |
| Muskingum River at McConnelsville | 7,422 | 2,871 | 109 | 70 | 89 | 110 |
| Scioto River near Prospect | 567 | 68 | 167 | 152 | 73 | 116 |
| Scioto River at Higby | 5,131 | 1,461 | 125 | 110 | 86 | 107 |
| Stillwater River at Pleasant Hill | 503 | 49 | 84 | 58 | 52 | 115 |

STREAMFLOW during August was above normal in the eastern two-thirds of Ohio but slightly below normal in the western one-third. Flows in north-central and northeastern Ohio were high enough to be considered excessive. August flows in most drainage basins decreased seasonally from the July flows, but in the northeast and north-central Ohio drainage basins, they increased sharply in response to the above normal precipitation.

Flows at the beginning of the month were below normal in the eastern half of the state and near or slightly above normal in the western half. Drainage basins in northeastern Ohio had their lowest flows for August during the first few days of the month while in the western half of the state, lowest flows

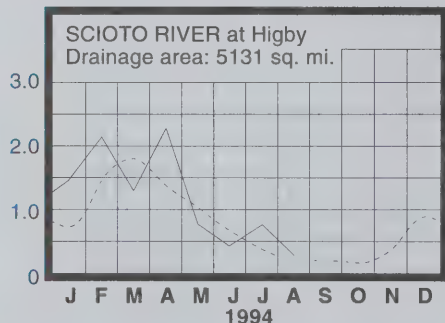
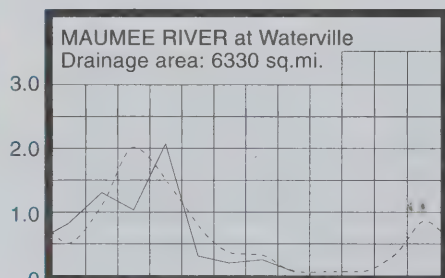
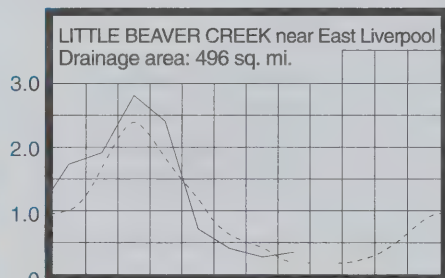
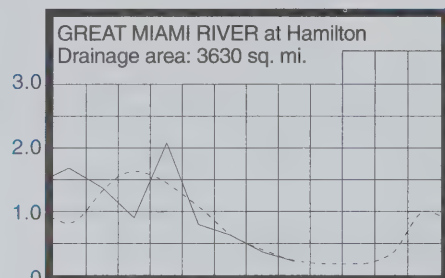
occurred a few days prior to the end of the month. Greatest flows for August in northern and eastern Ohio occurred after heavy showers and thunderstorms on August 13-14. Small stream and urban flooding was widespread, especially in extreme northeastern Ohio counties. Central and southwestern Ohio drainage basins had their greatest flows for August just prior to the end of the month. At the end of August, flows were mixed, being above normal in central and southeastern Ohio and below normal elsewhere.

RESERVOIR STORAGE for water supply during August declined seasonally in both the Mahoning and Scioto river basins. Storage was slightly above normal in the Mahoning basin reservoirs and slightly below normal in the Scioto basin reservoirs.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 79 percent of rated capacity for water supply compared with 81 percent for last month and 77 percent for August 1993. Month-end storage in the Scioto basin index reservoirs was 78 percent of rated capacity for water supply compared with 86 percent for last month and 87 percent for August 1993. Surface water supplies continue to remain at favorable levels for this time of the year.

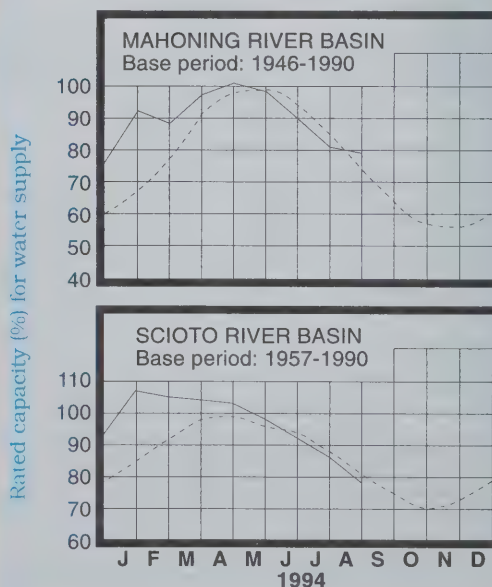
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

GROUND WATER LEVELS during August declined in all aquifers throughout Ohio. Net declines during the month were greater than usually observed in most aquifers. In most aquifers, water levels declined steadily throughout the month. Some shallow aquifers showed slight improvements following local precipitation, but quickly returned to the natural decline rate typical for August.

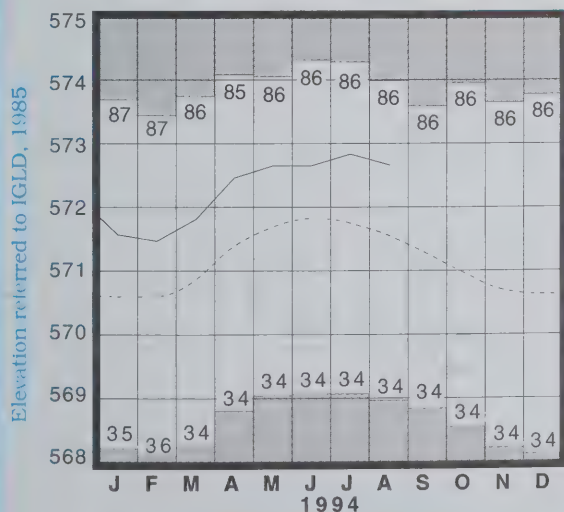
Ground water storage remains at below normal levels in most areas of the state. Some aquifers in central and northwestern Ohio continue to be at slightly above normal levels. Aquifers in the eastern half of the state continue to have the greatest departure from normal, ranging up to nearly 4 feet below normal. Index observation well F-1 (Fairfield County), representing sandstone aquifers in eastern and southeastern Ohio, reached a record-low level for August.

Current ground water levels in most aquifers are lower than the levels recorded in August 1993; in some aquifers, current levels are about the same or slightly higher than last year's levels. Ground water supplies remain adequate throughout Ohio; however, adequate precipitation during the upcoming recharge season will be needed to improve the situation. Water supply managers with ground water sources are encouraged to closely monitor their specific situations through the upcoming fall and winter recharge season.

LAKE ERIE level declined during August. The mean level was 572.67 feet (IGLD-1985), 0.16 foot below last month's mean level and 1.11 feet above normal. This month's level is the same as the August 1993 level and 3.47 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during August 1994 averaged 4.0 inches, 0.8 inch above normal. The entire Great Lakes basin averaged 4.2 inches of rain in August 1994, 1.1 inches above normal. Cumulative precipitation for 1994 through August in the Lake Erie basin averages 23.6 inches, which is normal, and for the entire Great Lakes basin 22.3 inches, 1.3 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

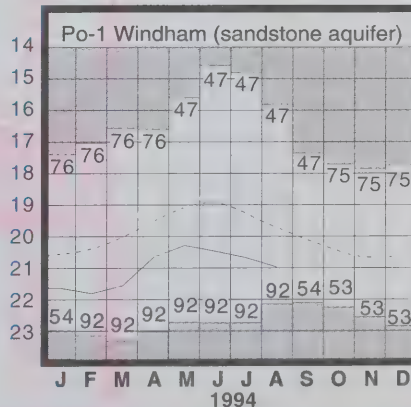
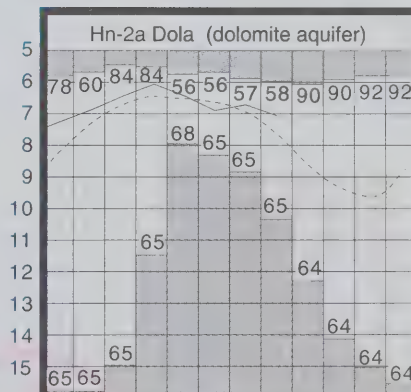
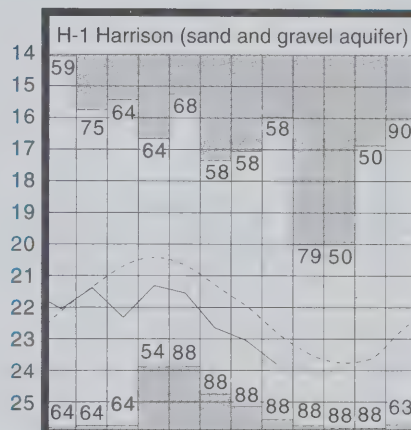
Normal - - - - Current

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 19.57 | -3.78 | -1.73 | -1.05 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.75 | -0.47 | -0.58 | +0.27 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.69 | +0.33 | -0.73 | -0.76 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.81 | -1.00 | -0.77 | -0.44 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.08 | +0.58 | -0.35 | -0.36 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.97 | -1.25 | -0.31 | +0.13 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.03 | -1.94 | -0.65 | +0.07 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Record high and low, year of occurrence

(continued from front page)

Precipitation for the 1994 water year is above normal throughout most of Ohio with only the Northwest and West Central regions having below normal precipitation. The state average is 37.22 inches, 2.65 inches above normal. Regional averages range from 43.42 inches, 5.31 inches above normal, for the South Central Region to 27.04 inches, 3.93 inches below normal, for the Northwest Region.

SUMMARY

Precipitation during August was above normal throughout most of Ohio with only the South Central and West Central regions having slightly below normal precipitation. Streamflow was above normal in the eastern two-thirds of the state and below normal in the western one-third. Reservoir storage declined and ranges from slightly above to slightly below normal seasonal levels. Ground water storage declined and is below normal in most areas of the state. Lake Erie level declined and was 1.11 feet above the long-term August average.

NOTES AND COMMENTS

FACT SHEETS AVAILABLE

The Ohio Department of Natural Resources, Division of Water is preparing a series of fact sheets concerning wide-ranging topics. Fact sheets have been prepared that detail services and information available at the Division of Water. Other fact sheets cover topics and issues of interest to homeowners, scientists and others. These easily reproducible fact sheets would be ideal for distribution to small groups, at information booths, in schools and through local government offices.

Single copies of the fact sheets listed below can be ordered at no cost from the ODNR-Division of Water, 1939 Fountain Square, Building E-3, Columbus, Ohio 43224, phone (614) 265-6717.

Fact Sheets of the Division of Water

| Sheet No. | Title |
|-----------|---|
| 1 --- | Water Efficiency at Home |
| 2 --- | Water Efficiency in Your Own Back Yard |
| 3 --- | Water Efficiency for Private Well Owners |
| 4 --- | The Ohio Canal System |
| 5 --- | Well Abandonment Regulations ODH and Ohio EPA |
| 6 --- | Properly Sealing Unused Wells |
| 7 --- | What is a Well Screen? |
| 8 --- | Well Log Computerization |
| 9 --- | Evaluating Ground Water Pollution Potential in Ohio |
| 10 --- | Ground Water Resources Mapping in Ohio |
| 11 --- | Precipitation in Ohio |
| 12 --- | Floods and Flood Damage Prevention |
| 13 --- | Facts About Flood Insurance |
| 14 --- | Well Construction Materials and Techniques |
| 15 --- | Before You Have a Well Drilled |
| 16 --- | How to Read Well Log and Drilling Reports |
| 17 --- | Services of the Ground Water Resources Section |
| 18 --- | The Hydrologic Cycle |
| 19 --- | Dry Driven Grout Method |
| 20 --- | Ground Water Level Monitoring in Ohio |
| 21 --- | How to Obtain Flood Maps |
| 22 --- | Community Water Supply Planning in Ohio |
| 23 --- | When Does a Well Log Need to be Filed? |
| 24 --- | What's Ground Water? |
| 25 --- | Ohio's Conservancy Districts |
| 26 --- | Lake Drains |
| 27 --- | Dam Safety: Rodent Control |
| 28 --- | Dam Safety: Trees and Brush |
| 29 --- | Dam Safety: Classification |
| 30 --- | Dam Safety: Failures |
| 31 --- | Dam Safety: Seepage |
| 32 --- | Dam Safety: Concrete Repair Techniques |
| 33 --- | Dam Safety: Inspection of Concrete Structures |
| 34 --- | Dam Safety: Construction Permits for Dams |
| 35 --- | Not Available |
| 36 --- | Facts About Floodproofing |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

Michele Wilks
Acting Chief





MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED
DATE 01-11-01 BY 60322 UCBAW

PRECIPITATION during September was below normal throughout the state. The state average was 1.80 inches, 1.20 inches below normal. Regional averages ranged from 2.54 inches, 0.64 inch below normal, for the Northeast Region to 0.93 inch, 1.92 inches below normal, for the Northwest Region. This was the fifth driest September during the past 100 years in the Northwest Region. Dorset (Ashtabula County) reported the greatest amount of precipitation during September, 4.08 inches; Roseville (Muskingum County) reported 4.05 inches, the only other location reporting more than four inches for the month. Xenia (Greene County) reported the least amount of precipitation during September, 0.52 inch. Many locations in the western half of the state reported less than one inch of rain in September.

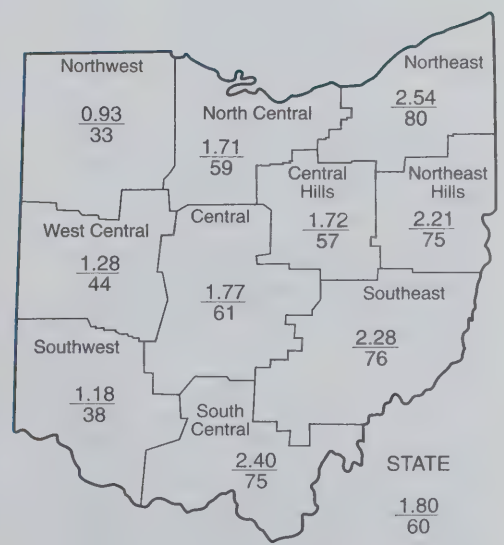
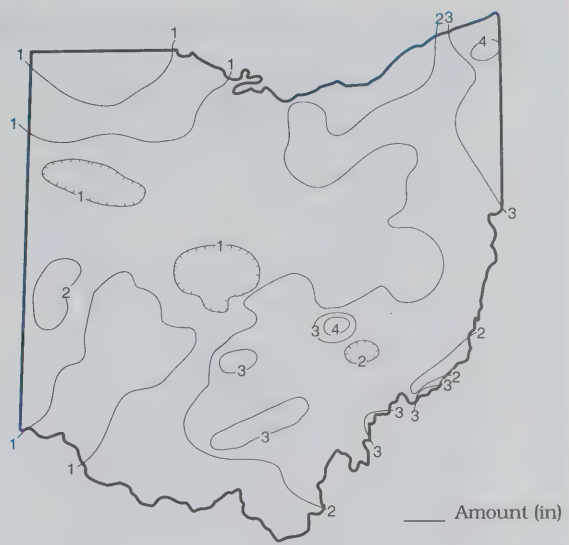
Precipitation during September was light and sparse throughout Ohio. Daily totals at any location seldom exceeded one inch with amounts usually less than 0.5 inch reported. The first half of the month was very dry in most areas of the state. Farmers and other interested attendees had beautiful weather to visit the Farm Science Review during September 20-22. Several days of rain occurred during the last week of the month in many areas of the state. Northern areas, especially northeastern Ohio, received the most rain during this period.

Precipitation for the 1994 calendar year is generally below normal in the western two-thirds of Ohio and above normal in the eastern one-third. The state average is 29.26 inches, 0.74 inch below normal. Regional averages range from 36.31 inches, 2.99 inches above normal, for the South Central Region to 21.74 inches, 5.05 inches below normal, for the Northwest Region.

Precipitation for the 1994 water year was above normal in the eastern two-thirds of the state and below normal in the western one-third. The state average was 39.08 inches, 1.51 inches above normal. Regional averages ranged from 45.87 inches, 4.58 inches above normal, for the South Central Region to 28.03 inches, 5.79 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). McArthur (Vinton County) reported the greatest amount of precipitation during the 1994 water year, 54.19 inches. Montpelier (Williams County) reported the least amount, 23.46 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1994 water year appear on the last page of this report.

The 1994 water year started off on a positive note as far as water supplies are concerned with above normal precipitation during three of the first four months; only December had below normal precipitation. Below normal precipitation in February and March drastically reduced the rate of recharge (continued on back)

PRECIPITATION SEPTEMBER 1994



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.92 | -2.46 | -3.20 | -5.79 | -1.78 | -2.3 |
| North Central | -1.17 | -0.98 | -0.70 | -0.02 | +1.68 | -2.8 |
| Northeast | -0.64 | +1.20 | +2.06 | +4.97 | +8.84 | +0.8 |
| West Central | -1.65 | -2.25 | -2.85 | -2.14 | +2.48 | +0.3 |
| Central | -1.12 | -0.88 | -1.74 | +0.13 | +1.66 | -1.8 |
| Central Hills | -1.31 | -0.27 | +0.65 | +3.15 | +2.61 | -2.0 |
| Northeast Hills | -0.73 | +0.25 | +0.41 | +4.74 | +4.64 | +0.5 |
| Southwest | -1.91 | -1.74 | -0.36 | -0.28 | -2.82 | -1.2 |
| South Central | -0.78 | -0.77 | -0.69 | +4.58 | -3.86 | -0.4 |
| Southeast | -0.71 | +1.03 | +1.00 | +5.59 | +0.87 | -0.4 |
| State | -1.20 | -0.69 | -0.54 | +1.51 | +1.46 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

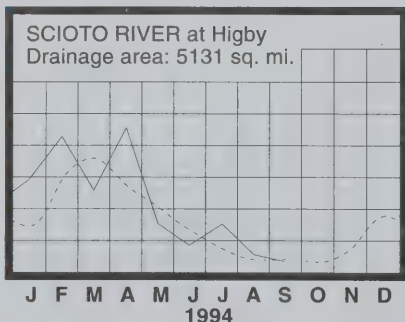
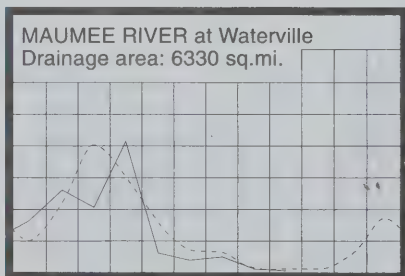
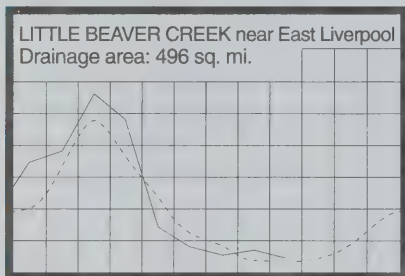
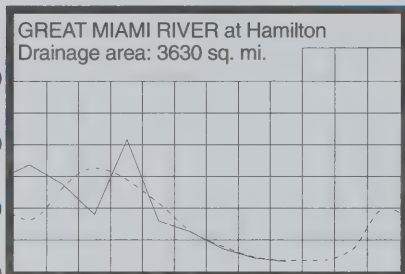
MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 31 | 14 | 102 | 80 | 103 |
| Great Miami River at Hamilton | 3,630 | 668 | 87 | 87 | 84 | 111 |
| Huron River at Milan | 371 | 43 | 131 | 128 | 99 | 94 |
| Killbuck Creek at Killbuck | 464 | 72 | 71 | 90 | 90 | 104 |
| Little Beaver Creek near East Liverpool | 496 | 115 | 125 | 89 | 80 | 99 |
| Maumee River at Waterville | 6,330 | 282 | 44 | 66 | 68 | 74 |
| Muskingum River at McConnellsville | 7,422 | 1,671 | 85 | 80 | 83 | 110 |
| Scioto River near Prospect | 567 | 25 | 81 | 247 | 104 | 116 |
| Scioto River at Higby | 5,131 | 1,028 | 84 | 122 | 97 | 108 |
| Stillwater River at Pleasant Hill | 503 | 37 | 75 | 76 | 62 | 114 |

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

STREAMFLOW during September was below normal in most areas of the state but slightly above normal in a few drainage basins in north-central and eastern Ohio. Flows in northwestern and some northeastern Ohio basins were low enough to be considered deficient. Streamflows during September were noticeably less than the flows during August.

Flows at the beginning of the month were near or slightly above normal in most areas of the state but below normal in the northwestern and northeastern Ohio drainage basins. Most areas had their greatest flows for September at the beginning of the month or later during the first week. The exception was in some east-central basins where the month's greatest flows occurred a few days before the end of the month. Lowest flows for the month generally occurred around

mid-month in the eastern half of the state and on or about September 24 in the western half. At the end of the month, flows were below normal in almost all areas of the state.

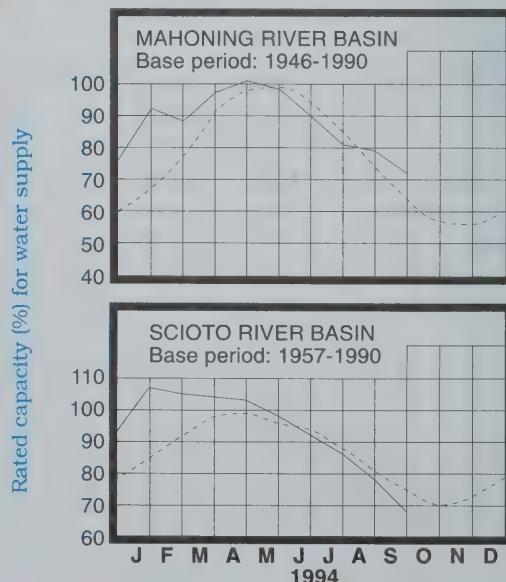
Streamflow for the 1994 water year was above normal in most areas of Ohio with only the north-central and northwestern drainage basins having below normal flows (see Mean Stream Discharge table, past 12 months column). Flows during the water year fluctuated between above and below normal mirroring the month's precipitation. Flows were unusually high during November responding to the noticeably above normal precipitation. After the January thaw, moderate flooding was widespread and often compounded by ice jams especially along the Ohio River and near Lake Erie. April showers resulted in some moderate flooding, and during the summer months, locally severe thunderstorms caused small stream and urban flooding locally, especially during August.

RESERVOIR STORAGE for water supply during September declined in both the Mahoning and Scioto river basins. Month-end storage was above normal in the Mahoning basin reservoirs and below normal in the Scioto basin reservoirs.

Reservoir storage at the end of September in the Mahoning basin index reservoirs was 72 percent of rated capacity for water supply compared with 79 percent for last month and 71 percent for September 1993. Month-end storage in the Scioto basin index reservoirs was 68 percent of rated capacity for water supply compared with 78 percent for last month and 78 percent for September 1993.

Surface water supplies were at favorable levels during the 1994 water year. Reservoir storage in most areas of Ohio was at above normal levels through the fall, winter and spring months. Storage fell to slightly below normal levels at the beginning of summer due to noticeably below normal precipitation during May and most of June. Reservoir storage declined seasonally through the end of the 1994 water year and although currently at below normal levels in some areas of Ohio, storage remains adequate as the 1995 water recharge season is set to begin.

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current

GROUND WATER LEVELS during September declined in all aquifers throughout Ohio. Net declines during September from last month's levels ranged from near normal to twice that usually observed. The Ohio Agricultural Statistics Service reports that at the end of September, topsoil moisture is rated as being adequate in 68 percent of the state, short in 30 percent of the state and surplus in 2 percent of the state.

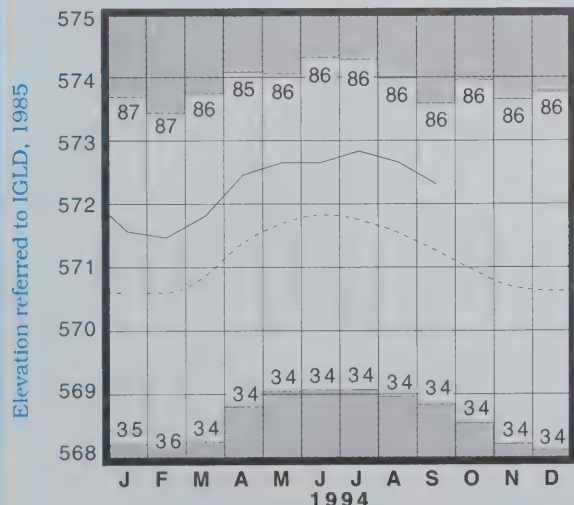
Ground water storage continues to remain at below normal levels in most areas of Ohio with only a few aquifers in northwestern Ohio having above normal levels. Some aquifers in eastern Ohio are near record-low levels for this time of the year. This month's levels are lower than the levels of a year ago in most areas of the state, but are slightly higher in a few areas where the 1994 water year precipitation has been generally greater than the precipitation during the last water year.

Ground water supplies during the 1994 water year were adequate throughout Ohio. Ground water storage at the beginning of the water year was noticeably below normal in the eastern half of the state and near to slightly below normal in the western half. The recharge season for the 1994 water year got off to a good start with above normal precipitation during three of the first four months, especially during November; however, precipitation during late winter and early spring months was below normal in most areas of the state and recharge rates were reduced. Also, the frozen ground may have played a role in the reduced recharge rates. Adequate precipitation during April was a blessing as May and most of June were unusually dry. Precipitation during the summer was spotty, and noticeably below normal in September. The 1994 water year ended as it began with ground water supplies in the eastern half of the state at noticeably below levels and in the western half at near or slightly below normal levels. Water supply managers with ground water sources should monitor their specific situation through the upcoming recharge season.

LAKE ERIE level declined during September. The mean level was 572.31 feet (IGLD-1985), 0.36 foot below last month's mean level and 1.05 feet above normal. This month's level is the same as the September 1993 level and 3.11 feet above low water datum.

Lake Erie level remained above normal throughout the 1994 water year. The U. S. Army Corps of Engineers projections indicate that the level of Lake Erie will remain above the long-term average for at least the next six months based on the current conditions of the lake and anticipated future weather conditions.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

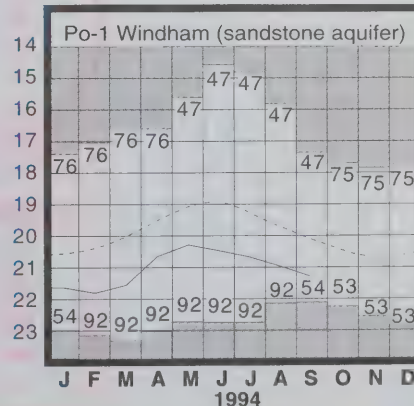
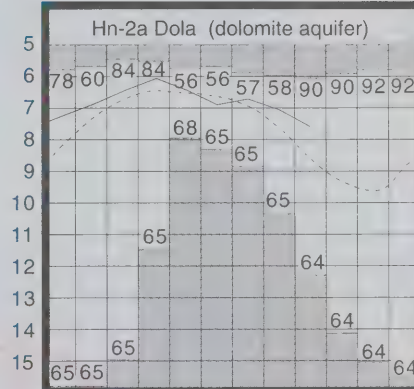
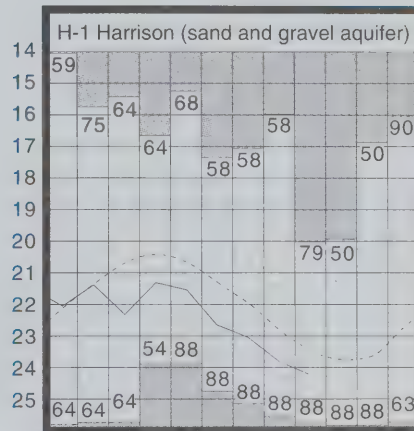
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 19.95 | -3.53 | -0.38 | -0.56 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 9.15 | -0.48 | -0.40 | +1.02 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 44.66 | -0.16 | -0.97 | -1.16 |
| H-1 | Harrison, Hamilton Co. | Gravel | 24.23 | -0.76 | -0.42 | -0.30 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.60 | +1.01 | -0.52 | +0.45 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.30 | -1.18 | -0.33 | -0.29 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.54 | -2.03 | -0.51 | +0.24 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

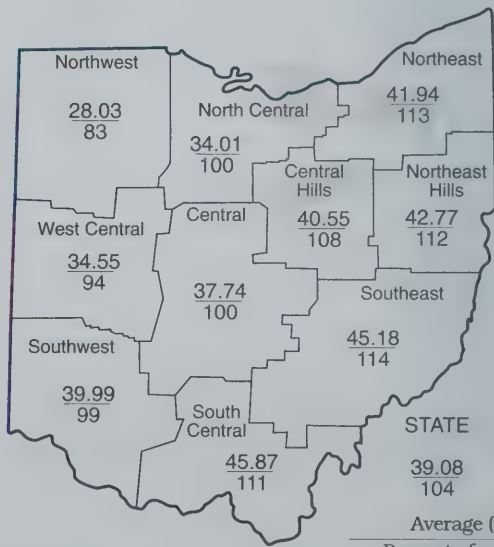
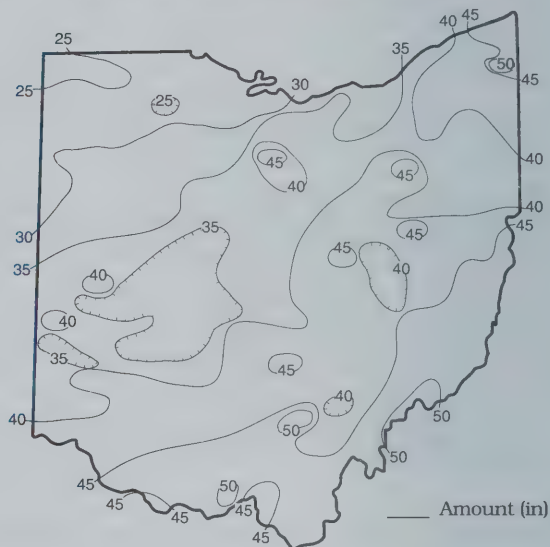
to water supplies. April brought above normal precipitation, but unusually dry weather during May and the first half of June brought an abrupt end to the recharge season. Drought-like conditions during May and June concerned farmers and water supply managers. Timely rains during the second half of June, in July and in August resulted in a satisfactory growing season for most areas of the state. The 1994 water year ended with an unusually dry September with water supply managers looking forward to the upcoming recharge season.

SUMMARY

Precipitation during September was below normal throughout Ohio. Streamflow was below in most drainage basins. Reservoir storage declined and ranged from slightly above to slightly below normal. Ground water storage declined and is at below normal levels in most aquifers throughout the state. Lake Erie level declined and was 1.05 feet above the long-term September average.

Precipitation for the 1994 water year was above normal in the eastern two-thirds of Ohio and below in the western one-third. Streamflow was above normal in all but the northwestern and north-central Ohio drainage basins. Reservoir storage was at above normal levels during the fall and winter months, but in late spring it fell to below normal. Ground water storage was at noticeably below normal levels in the eastern half of the state and near normal elsewhere. Lake Erie was above the long-term average throughout the water year.

Total Precipitation 1994 Water Year



ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



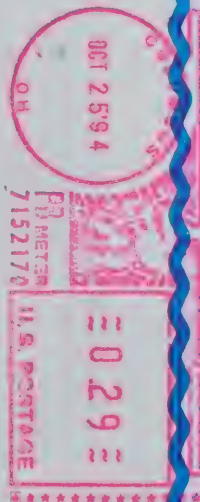
DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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CHAMPAIGN, IL 61820





MONTHLY WATER INVENTORY REPORT FOR OHIO

October 1994

Compiled By David H. Cashell

Hydrologist

Water Inventory Unit

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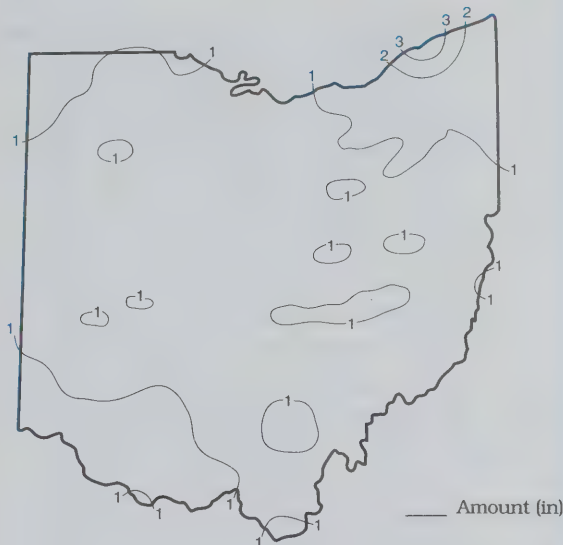
PRECIPITATION for October was noticeably below normal throughout Ohio. The state average was 0.92 inch, 1.42 inches below normal. This ties with October 1964 as being the tenth driest October in 112 years of record. Regional averages ranged from 1.47 inches, 1.25 inches below normal, for the Northeast Region to 0.68 inch, 1.46 inches below normal, for the North Central Region. Painesville (Lake County) reported the greatest amount of precipitation for the month, 3.02 inches. Beach City Lake (Tuscarawas County) reported the least amount of October precipitation, 0.33 inch.

Precipitation during October fell as light showers. Daily totals seldom exceeded 0.5 inch, usually much less. Most areas of the state received between 0.5 and 1.0 inch for the entire month; only a few locations in extreme northeastern Ohio received more than 1.5 inches of precipitation in October. The dry weather was beneficial for farmers harvesting crops, but also brought concerns about winter wheat germination. The Ohio Agricultural Statistics Service reports that at the end of October soil moisture was rated as being short in 72 percent of the state and adequate in 28 percent of the state.

Precipitation for the 1994 calendar year is below normal in the western, central and north-central areas of the state and above normal in the eastern and south-central areas. The state average is 30.18 inches, 2.16 inches below normal. Regional averages range from 37.29 inches, 1.73 inches above normal, for the South Central Region to 22.64 inches, 6.44 inches below normal, for the Northwest Region.

The 1995 water year (October 1, 1994 - September 30, 1995) is not off to a good start as far as precipitation is concerned. The noticeably dry conditions of this month, coupled with the noticeably below normal precipitation in September, causes concern as the recharge season begins. Adequate precipitation will be needed during the next several months to provide much needed replenishment of our water supplies, especially ground water supplies.

PRECIPITATION OCTOBER 1994

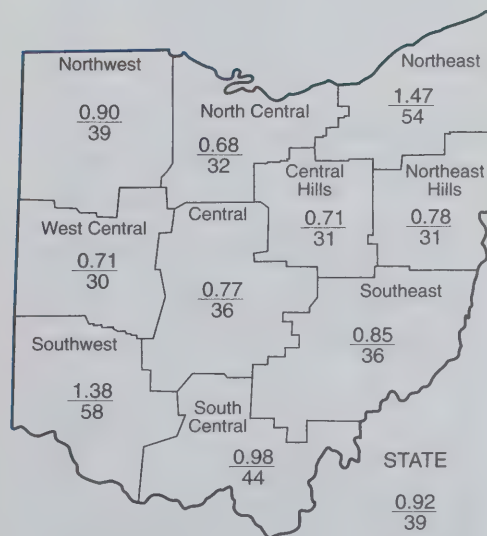


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.39 | -3.19 | -5.93 | -6.65 | -3.15 | -3.0 |
| North Central | -1.46 | -1.45 | -2.89 | -1.86 | -0.12 | -2.3 |
| Northeast | -1.25 | +0.38 | -1.17 | +3.20 | +7.50 | -1.1 |
| West Central | -1.63 | -3.20 | -4.53 | -3.91 | +1.35 | -2.5 |
| Central | -1.37 | -2.02 | -3.57 | -2.04 | +0.70 | -2.2 |
| Central Hills | -1.55 | -1.27 | -2.31 | +1.19 | +1.69 | -2.4 |
| Northeast Hills | -1.75 | -0.92 | -2.00 | +2.68 | +3.36 | -1.2 |
| Southwest | -1.01 | -2.64 | -3.90 | -2.30 | -3.20 | -1.5 |
| South Central | -1.26 | -2.23 | -3.20 | +2.40 | -3.56 | -1.2 |
| Southeast | -1.48 | -1.46 | -1.79 | +3.20 | +0.57 | -0.8 |
| State | -1.42 | -1.81 | -3.14 | -0.40 | +0.54 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | This Month | | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | Mean Discharge (CFS) | % of Normal | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 119 | 34 | 67 | 48 | 103 |
| Great Miami River at Hamilton | 3,630 | 532 | 70 | 72 | 69 | 110 |
| Huron River at Milan | 371 | 11 | 33 | 151 | 70 | 93 |
| Killbuck Creek at Killbuck | 464 | 69 | 69 | 81 | 61 | 104 |
| Little Beaver Creek near East Liverpool | 496 | 86 | 71 | 107 | 62 | 99 |
| Maumee River at Waterville | 6,330 | 276 | 45 | 45 | 38 | 73 |
| Muskingum River at McConnsville | 7,422 | 1,033 | 55 | 81 | 56 | 109 |
| Scioto River near Prospect | 567 | 23 | 83 | 66 | 80 | 115 |
| Scioto River at Higby | 5,131 | 936 | 101 | 82 | 81 | 109 |
| Stillwater River at Pleasant Hill | 503 | 37 | 62 | 60 | 46 | 112 |

STREAMFLOW during October was noticeably below normal throughout most of state with only a few exceptions of near normal flow noted. Flows in the western and north-central Ohio drainage basins were low enough to be considered deficient. Generally, flows during October were about the same or slightly less than the flows recorded during September.

Flows at the beginning of October were below normal in most areas of the state. Daily streamflow throughout the month was relatively steady in most drainage basins as precipitation was light during the month and many streams were possibly at or approaching base flow conditions. Most drainage basins had their greatest flows for October during the first few days of the month. Lowest flows occurred at various times throughout the month in the different

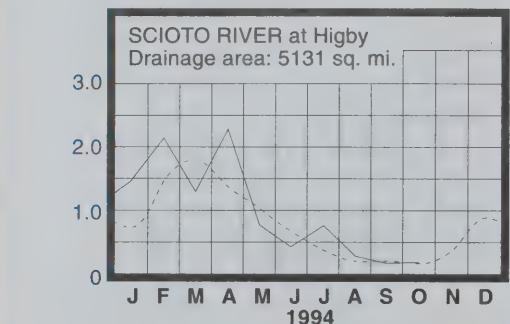
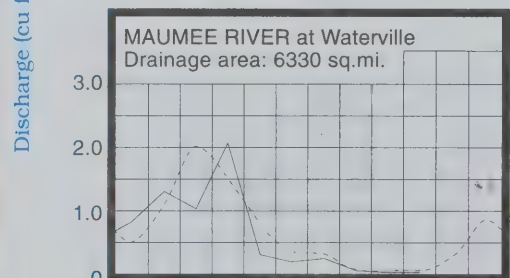
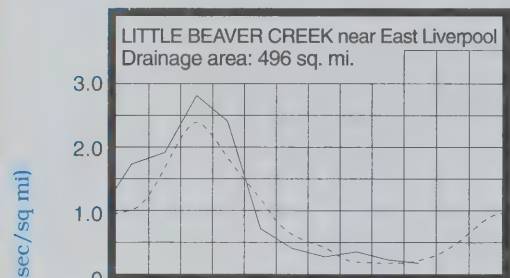
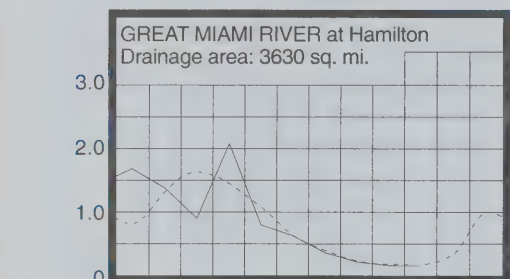
drainage basins. At the end of October, flows were noticeably below normal throughout the state.

RESERVOIR STORAGE for water supply during October declined in both the Mahoning and Scioto river basins. Month-end storage was above normal in the Mahoning basin index reservoirs and below normal in the Scioto basin index reservoirs.

Reservoir storage at the end of October in the Mahoning basin index reservoirs was 66 percent of rated capacity for water supply compared with 72 percent for last month and 65 percent for October 1993. Month-end storage in the Scioto basin index reservoirs was 58 percent of rated capacity for water supply compared with 68 percent for last month and 71 percent for October 1993.

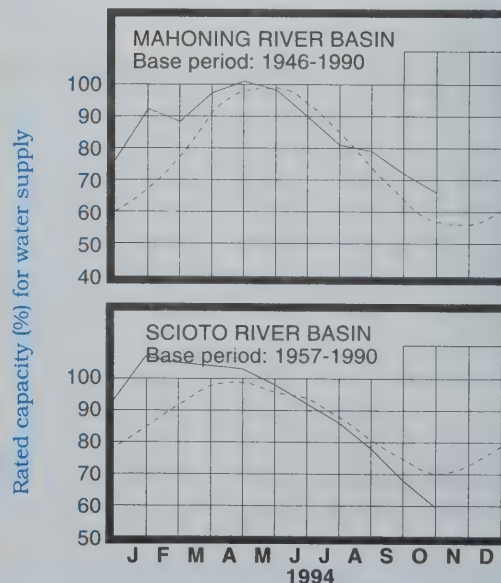
Flood control reservoir operators will soon begin the annual fall drawdown. Water supply reservoir operators, especially those with off-stream sources, will pick up water as streamflows permit. Surface-water supplies are adequate at this time. Several months are still available for the increased streamflows needed to fill both on- and off-stream reservoirs before next summer's peak demand season.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND WATER LEVELS

October declined in all aquifers throughout Ohio. Levels declined steadily throughout the month in most aquifers. Net declines during October from last month's levels ranged from about normal to nearly six times that normally observed.

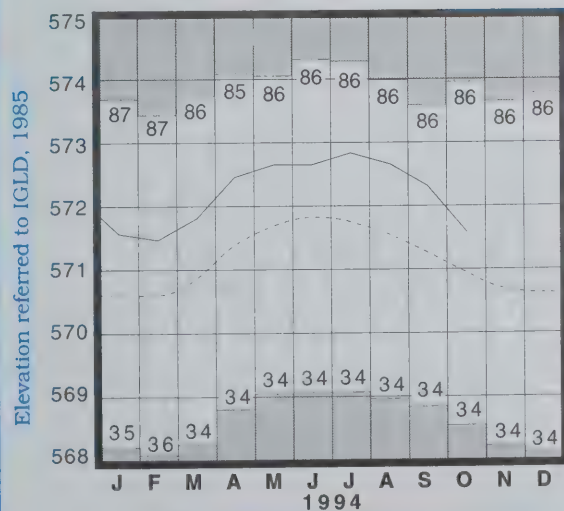
Ground water storage continues to remain at below normal levels in most areas of Ohio. Only a few aquifers in the northwestern area of the state have above normal levels. Some aquifers in the eastern half of the state are at noticeably below normal levels. Index observation well F-1 (Fairfield County), representing sandstone aquifers in eastern and southeastern Ohio, reached a record-low level for October.

The 1995 water year recharge season is not off to a good start as far as ground water supplies are concerned. Near normal climatic conditions during the next several months should result in adequate recharge to ground water supplies. Below normal precipitation during this period would have adverse effects. Water supply managers with ground water sources should closely monitor their situations throughout the recharge season.

LAKE ERIE level declined during October. The mean level was 571.59 feet (IGLD-1985), 0.72 foot below last month's mean level and 0.63 foot above normal. This month's level is 0.33 foot lower than the October 1993 level and 2.39 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during October 1994 averaged 1.5 inches, 1.2 inches below normal. The entire Great Lakes basin averaged 2.0 inches of precipitation in October 1994, 0.8 inch below normal. Cumulative precipitation for 1994 through October in the Lake Erie basin averages 26.7 inches, 2.7 inches below normal, and in the entire Great Lakes basin 26.9 inches, 0.3 inch below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

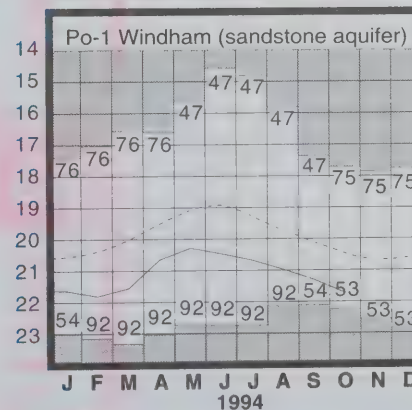
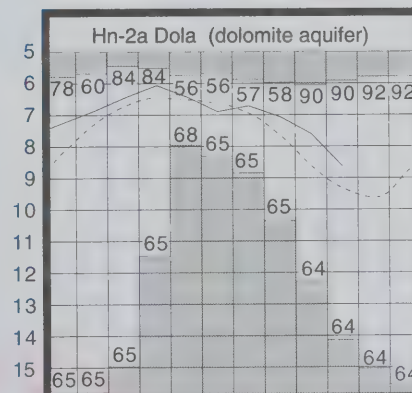
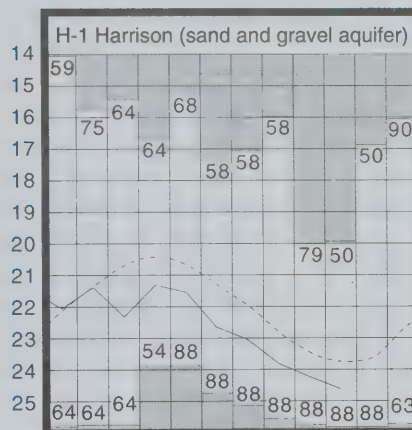
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 20.95 | -4.06 | -1.00 | -1.03 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 9.63 | -0.62 | -0.48 | +2.00 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 45.18 | -0.74 | -0.52 | -1.47 |
| H-1 | Harrison, Hamilton Co. | Gravel | 24.61 | -0.85 | -0.38 | -0.66 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 8.65 | +0.68 | -1.05 | +0.55 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.72 | -1.25 | -0.42 | +0.26 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.96 | -2.35 | -0.42 | +0.14 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Normal - - - - Current - - - -

SUMMARY

Precipitation was noticeably below normal statewide. This month ties with October 1964 as the tenth driest October in 112 years of records. Streamflow was below normal in most areas. Reservoir storage declined and was above normal in the Mahoning basin reservoirs but below normal in the Scioto basin reservoirs. Ground water storage declined and remained at below normal levels especially in the eastern half of Ohio where they are near record-low seasonal levels. Lake Erie level declined and was 0.63 foot above the long-term October average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Hancock County by Kelly C. Smith, ERM-Midwest, Inc. in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each Ground Water Pollution Potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

The following ground water resources maps have been revised and reprinted:

The Ground Water Resources of Delaware County by William C. Haiker (after Schmidt, 1979)

The Ground Water Resources of Lake County by James J. Schmidt

The Ground Water Resources of Summit County by James J. Schmidt

These new maps have been updated with additional hydrogeologic information obtained since their first printing. Ground water resources maps have been completed for 86 of Ohio's 88 counties.

Ground water resources maps are prepared by staff hydrogeologists. These maps show the regional ground water characteristics based on interpretations of water well drilling records and local geology. These color-coded maps provide well log data for many point locations. Information provided by the maps include typical depths of wells, water-bearing formations and estimated yields for wells in the area.

Ground water resources maps can be used as a guide to locate new or expand existing ground water supplies. The maps are useful to homeowners, ground water consultants, engineers, planners and developers. Ground water resources maps cost \$8.00 each.

Publications prepared by the ODNR Division of Water, Water Resources Section can be purchased at or ordered from:

ODNR Division of Water, Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1936.

Make checks payable to ODNR Division of Water. If ordered through the mail, please include the correct postage and handling charges. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conterminous District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



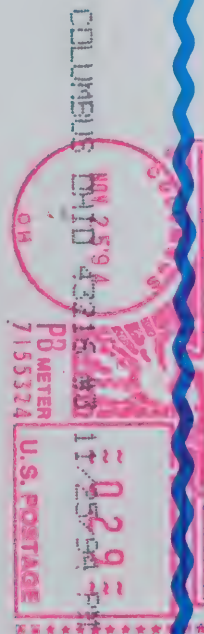
DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

An Equal Opportunity Employer-M/F/H





MONTHLY WATER INVENTORY REPORT FOR OHIO

November 1994

Compiled By David H. Cashell

Hydrologist

Water Inventory Unit

JA 4 '95

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PRECIPITATION for November was above normal throughout m with only the South Central Region having slightly below normal precipitation. The state average was 3.10 inches, 0.45 inch above normal. Regional averages ranged from 3.97 inches, 1.37 inches above normal, for the Northeast Hills Region to 2.72 inches, 0.05 inch below normal, for the South Central Region. New Cumberland Locks and Dam (Jefferson County) reported the greatest amount of precipitation for the month, 5.00 inches. Marietta State Nursery (Washington County) reported the least amount, 1.94 inches.

Precipitation during November fell almost entirely as rain with very little snow being reported; only small amounts of snow fell in the northeastern Ohio snowbelt area. Chardon (Geauga County), Ohio's snow capital, reported only 1 inch of snow which is about 11 inches below normal. The month started with several days of precipitation during the first week with precipitation totals for the period ranging from 0.5 to 1 inch. Many areas of Ohio received a good shower during November 9-10 with rain amounts of nearly 1 inch reported at many locations. The middle of the month was relatively dry in many areas of the Ohio, but some areas in the southern half of the state received 0.5 to nearly 1 inch of rain on November 15-16. Some rain and snow fell, especially in the northeastern area of the state, just prior to Thanksgiving. The month's most widespread precipitation fell during November 27-28 with most areas of Ohio reporting from 0.75 to about 1 inch of rain and at a few locations nearly 1.5 inches was reported.

Precipitation for the 1994 calendar year is below normal in the western, central and north-central areas of Ohio and above normal in the eastern and south-central areas. The state average is 33.28 inches, 1.71 inches below normal. Regional averages range from 40.01 inches, 1.68 inches above normal, for the South Central Region to 25.87 inches, 5.64 inches below normal, for the Northwest Region. The West Central Region's 1994 calendar year average precipitation is 27.64 inches, 6.58 inches below normal, the greatest regional departure from normal for the 1994 calendar year.

Precipitation for the 1995 water year is below normal throughout the state. The state average is 4.02 inches, 0.97 inch below normal. Regional averages range from 4.75 inches for both the Northeast Hills and Southwest regions, 0.38 inch and 0.62 inch below normal respectively, to 3.43 inches, 1.14 inches below normal, for the North Central Region.

Precipitation for the 1995 water year is off to a slow start; however, several months remain with the potential for precipitation and favorable climatic conditions needed to replenish water supplies. Soil moisture is slowly being replenished. The last report (November 20, 1994) indicated that 69 percent of the state had adequate soil moisture and 30 percent of the state had a shortage of soil moisture.

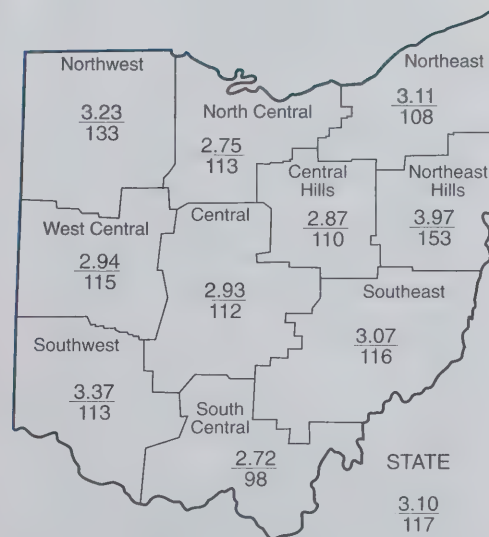
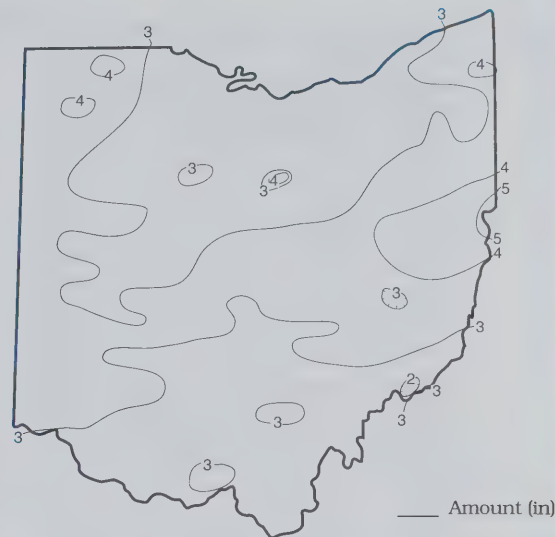
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.80 | -2.51 | -3.10 | -6.68 | -4.86 | -2.6 |
| North Central | +0.32 | -2.31 | -1.04 | -3.73 | -2.92 | -1.2 |
| Northeast | +0.23 | -1.66 | +0.47 | +0.90 | +5.57 | -0.4 |
| West Central | +0.38 | -2.90 | -2.93 | -6.97 | -0.77 | -2.3 |
| Central | +0.31 | -2.18 | -1.78 | -4.39 | -1.08 | -1.7 |
| Central Hills | +0.26 | -2.60 | -0.60 | -1.49 | -0.15 | -1.5 |
| Northeast Hills | +1.37 | -1.11 | +0.02 | +1.61 | +3.63 | -0.4 |
| Southwest | +0.39 | -2.53 | -2.50 | -3.87 | -4.51 | -1.1 |
| South Central | -0.05 | -2.09 | -2.68 | +0.94 | -4.41 | -1.3 |
| Southeast | +0.43 | -1.76 | -0.63 | +1.88 | +0.18 | -0.8 |
| State | +0.45 | -2.17 | -1.48 | -2.17 | -0.90 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION NOVEMBER 1994



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 319 | 28 | 23 | 53 | 92 |
| Great Miami River at Hamilton | 3,630 | 663 | 51 | 54 | 70 | 92 |
| Huron River at Milan | 371 | 24 | 28 | 33 | 85 | 85 |
| Killbuck Creek at Killbuck | 464 | 102 | 50 | 53 | 61 | 99 |
| Little Beaver Creek near East Liverpool | 496 | 315 | 138 | 93 | 69 | 99 |
| Maumee River at Waterville | 6,330 | 528 | 30 | 27 | 39 | 68 |
| Muskingum River at McConnelsville | 7,422 | 3,011 | 64 | 60 | 61 | 103 |
| Scioto River near Prospect | 567 | 34 | 35 | 36 | 111 | 96 |
| Scioto River at Higby | 5,131 | 1,256 | 66 | 66 | 87 | 101 |
| Stillwater River at Pleasant Hill | 503 | 66 | 72 | 49 | 51 | 77 |

STREAMFLOW during November was noticeably below normal throughout most of the state with only a few drainage basins in extreme eastern Ohio having above normal flows. Flows in most areas were low enough to be considered deficient. Flows during November increased seasonally from the flows recorded during October.

Streamflows at the beginning of November were noticeably below normal throughout most of Ohio; the exception was in extreme eastern Ohio where flows were above normal. Drainage basins in the northern and southeastern areas of the state had their lowest flows for November during the first several days of the month while drainage basins in central and south-

western Ohio had their lowest flows near November 26, just prior to the month's most widespread precipitation. Greatest flows for November occurred a day or two before the end of the month in most areas of the state following this precipitation. Some drainage basins across northern Ohio recorded slightly greater flows on or about November 11. Flows at the end of the month remained below normal throughout most of the state with only a few drainage basins across central Ohio having above normal flows.

RESERVOIR STORAGE for water supply during November declined in both the Mahoning and Scioto river basins. Month-end storage remained slightly above normal in the Mahoning basin index reservoirs. Storage continued to decline in the Scioto basin index reservoirs and fell to the lowest month-end level since January 1988.

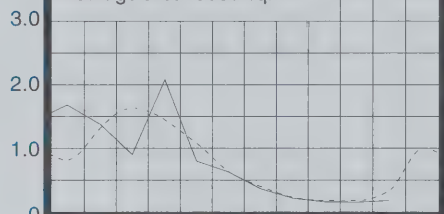
Reservoir storage at the end of November for the Mahoning basin index reservoirs was 63 percent of rated capacity for water supply compared with 66 percent for last month and 77 percent for November 1993. Month-end storage in the Scioto basin index reservoirs was 52 percent of rated capacity for water supply compared with 58 percent for last month and 83 percent for November 1993.

Surface water supplies continue to remain adequate in spite of the noticeably below normal reservoir levels in some areas. Several months remain with potential for the increased runoff and streamflows needed to fill both on- and off-stream reservoirs.

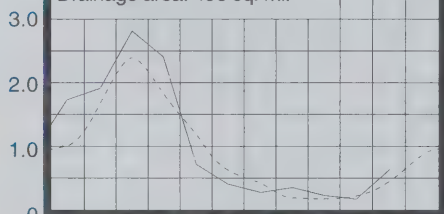
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)

GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



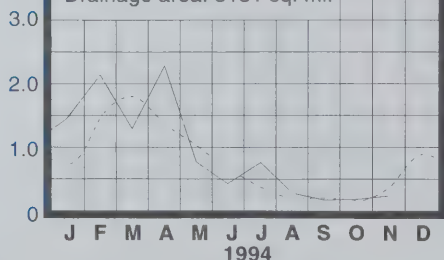
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



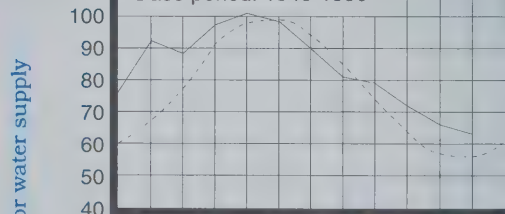
SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



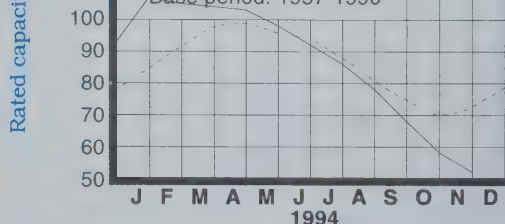
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



Based on daily lowest level in feet below land-surface datum

GROUND WATER LEVELS during November declined slowly or were stable in most aquifers throughout Ohio, somewhat typical of the season. A few aquifers showed net improvement in ground water storage during the month, but most aquifers continued to receive inadequate recharge to compensate for natural discharge or withdrawals. In most aquifers, net changes during November from last month's levels were greater than usually observed.

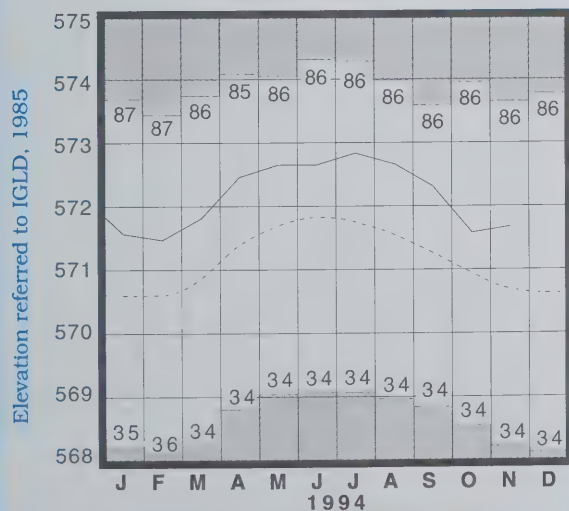
Ground water storage continues to remain at noticeably below normal levels in most areas of Ohio, especially in the eastern half of the state where levels are at or near record-low levels. Current levels range from just above normal to more than four feet below normal. During November, index observation well F-1 (Fairfield County), representing sandstone aquifers in eastern and southeastern Ohio, reached its lowest level ever observed and index observation well Tu-1 (Tuscarawas County), representing sand and gravel aquifers in eastern and northeastern Ohio, equaled its lowest level ever observed. Both of these wells have records that date back to 1947.

Ground water storage is currently averaging lower levels than last year in most areas of the state. Climatic conditions during the past few months have not been favorable for a quick start to the 1995 water year recharge season. Near normal climatic conditions during the next several months will be necessary for a favorable recharge period. Water supply managers with ground water sources should continue to closely monitor their situations throughout the recharge season.

LAKE ERIE level rose slightly during November. The mean level was 571.68 feet (IGLD-1985), 0.09 foot above last month's mean level and 0.98 foot above normal. This month's level is 0.04 foot lower than the November 1993 level and 2.48 feet above Low Water Datum.

Lake Erie's level has declined 1.15 feet since peaking at its highest monthly mean level in 1994 of 572.83 feet during July. Levels have been averaging about one foot above normal throughout this period. The U. S. Army Corps of Engineers predicts that Lake Erie will continue to remain above its average level for the next six months based on the present condition of the lake basin and anticipated future weather conditions.

LAKE ERIE LEVELS at Fairport

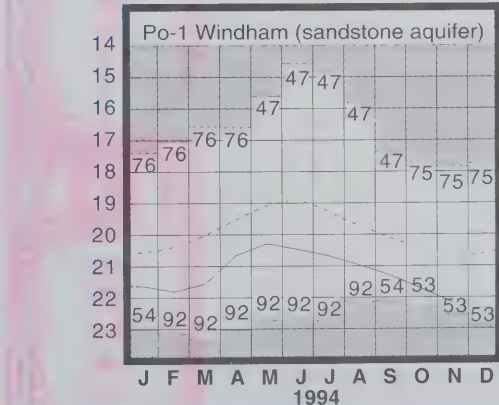
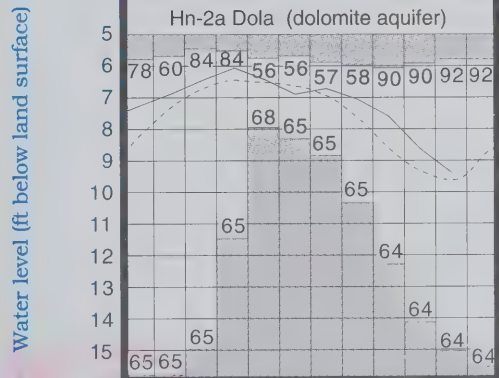
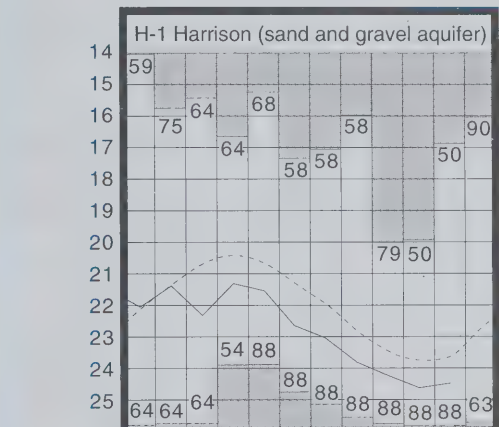


Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current - - - -

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.
Po-1, 1947-1990

Record high and low, year of occurrence

SUMMARY

Precipitation was above normal throughout most of the state. Streamflow was below normal in most drainage basins and low enough to be considered deficient in most areas. Reservoir storage declined and was at noticeably below normal levels in the central area of the state. Ground water storage declined in most aquifers and reached record-low levels in the eastern half of the state. Lake Erie level rose slightly and was 0.98 foot above the long-term November average.

NOTES AND COMMENTS

NEW EMPLOYEES JOIN WRS STAFF

Two new employees have recently joined the Division of Water staff in the Water Resources Section (WRS).

Gerrie McCall-Neubauer recently joined the WRS as a cartographer in the Cartography Unit. She will be producing ground water resource and pollution potential maps as well as assisting and coordinating many desktop publishing activities.

Gerrie earned a Bachelor of Arts degree in English from the University of Houston and a Master's degree in geographical information system design from The Ohio State University. She is a member of the Association of American Geographers and the American Society for Photogrammetry and Remote Sensing. Away from work, Gerrie enjoys reading, photography, and producing videos for the local cable access channel.

Patty Russell has joined the WRS as a clerk in the Technical Services Unit. She has been employed at ODNR since 1987, working previously with the Division of Wildlife in the hunting and fishing license section. At the WRS, Patty will be assisting visitors who are using the division's well logs, processing well logs on the division's computer/optical disk system and performing many other clerical duties. Away from work, Patty enjoys her grandchildren, soon to number three. She and her husband of twenty-six years, Pat, are currently planning the wedding of their last child.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:

U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index;

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources



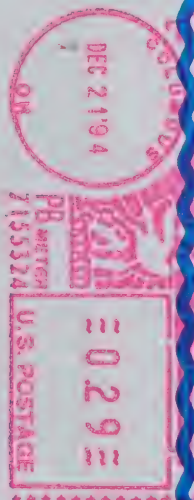
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MONTHLY WATER INVENTORY REPORT FOR OHIO

December 1994

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

MR 09 '95

OHIO STATE WATER STATE LIBRARY COPY

PRECIPITATION for December was near normal throughout most of Ohio with nearly all locations receiving between 2 and 3 inches of precipitation; some areas in the western area of the state had below normal precipitation. The state average was 2.59 inches, 0.01 inch above normal. Regional averages ranged from 3.00 inches, 0.04 inch above normal, for the South Central Region to 2.14 inches, 0.33 inch below normal, for the West Central Region. Mansfield Airport (Richland County) reported the greatest amount of precipitation for the month, 3.01 inches. Xenia (Greene County) reported the least amount of December precipitation, 1.21 inches.

Most of the precipitation during December fell during the first half of the month and fell as rain. Above normal temperatures during most of the month kept snowfall to a minimum, especially in the southern two-thirds of the state. Some areas in the north-central area of the state reported more than 5 inches of snow for the month, but Chardon (Geauga County), Ohio's snow capital, reported only 3 inches, more than 22 inches below normal.

Precipitation occurred on many of the days from December 4-11. Most areas of Ohio received from 0.5 to 1 inch of rain during December 4-5 and another 0.25 inch or so during December 6-7. The greatest amount of precipitation statewide fell during December 9-11 with 0.75 inch to 1.5 inches reported. The larger amounts fell in the eastern and southern areas of the state. More rain fell on December 16 with about 0.5 inch reported in most areas of the state with slightly greater amounts falling in the north-central area. The month ended with small amounts of precipitation falling late on New Year's Eve.

Precipitation for the 1995 water year is below normal throughout the state. The state average is 6.57 inches, 1.00 inch below normal. Regional averages range from 7.29 inches, 0.42 inch below normal, for the Northeast Hills Region to 5.79 inches, 1.58 inches below normal, for the West Central Region. The 1995 water year recharge season is not off to a good start as far as precipitation and its influence on water supplies is concerned. Several months remain with the potential to provide the much needed precipitation for adequate replenishment of water supplies.

Precipitation for the 1994 calendar year was below normal in the western, central and north-central areas of Ohio and above normal in the eastern and south-central areas. The state average was 35.86 inches, 1.71 inches below normal. Regional averages ranged from 43.26 inches, 1.97 inches above normal, for the South Central Region to 28.47 inches, 5.35 inches below normal, for the Northwest Region. The West Central Region had the greatest departure from its normal precipitation during 1994 with an average of 29.78

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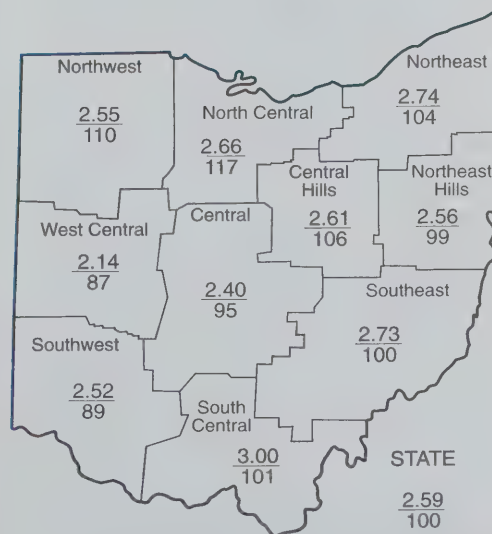
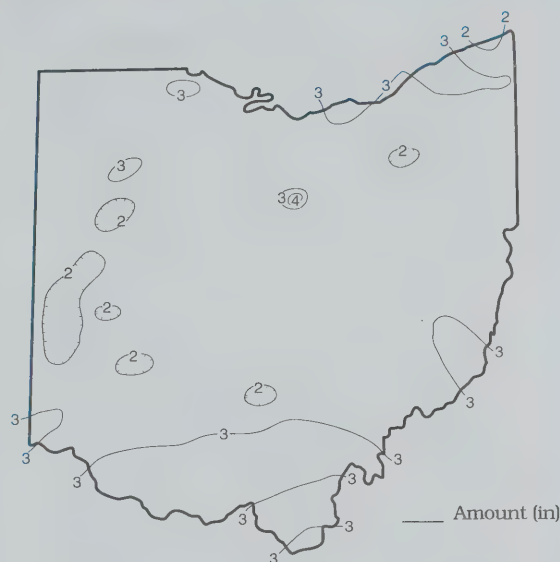
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.24 | -0.30 | -2.76 | -5.35 | -4.95 | -1.6 |
| North Central | +0.38 | -0.81 | -1.74 | -3.04 | -2.82 | +0.2 |
| Northeast | +0.10 | -0.99 | +0.21 | +0.96 | +5.27 | +0.8 |
| West Central | -0.33 | -1.58 | -3.83 | -6.91 | +0.43 | -2.3 |
| Central | -0.13 | -1.16 | -2.10 | -4.12 | +0.11 | -0.9 |
| Central Hills | +0.14 | -1.17 | -1.44 | -1.19 | +1.14 | 0.0 |
| Northeast Hills | -0.02 | -0.42 | -0.21 | +1.86 | +4.12 | +0.2 |
| Southwest | -0.30 | -1.30 | -3.00 | -3.94 | -3.36 | -0.6 |
| South Central | +0.04 | -1.16 | -1.79 | +1.97 | -3.01 | -0.6 |
| Southeast | +0.01 | -1.10 | -0.03 | +2.53 | +1.09 | -0.4 |
| State | +0.01 | -1.00 | -1.67 | -1.71 | -0.16 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION DECEMBER 1994



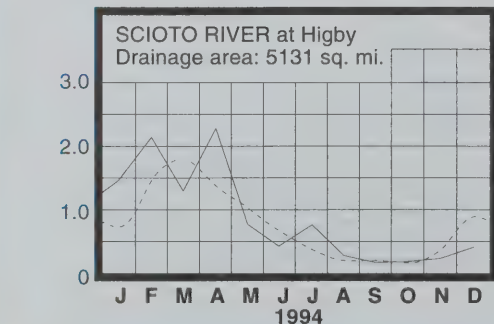
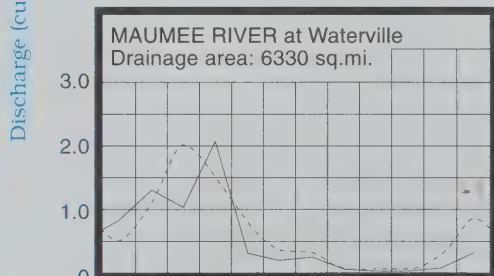
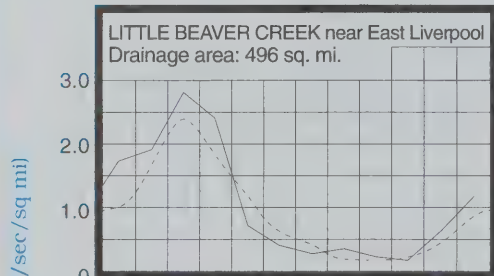
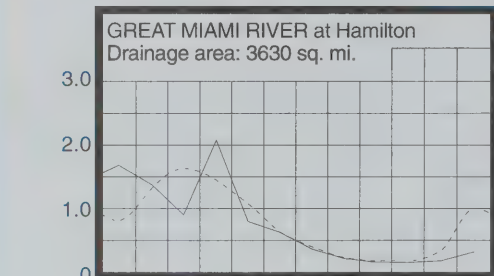
Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,161 | 69 | 45 | 60 | 89 |
| Great Miami River at Hamilton | 3,630 | 1,168 | 32 | 41 | 51 | 81 |
| Huron River at Milan | 371 | 126 | 85 | 47 | 60 | 81 |
| Killbuck Creek at Killbuck | 464 | 192 | 51 | 55 | 61 | 94 |
| Little Beaver Creek near East Liverpool | 496 | 587 | 132 | 133 | 96 | 101 |
| Maumee River at Waterville | 6,330 | 2,027 | 37 | 31 | 40 | 66 |
| Muskingum River at McConnelsville | 7,422 | 5,778 | 81 | 75 | 73 | 99 |
| Scioto River near Prospect | 567 | 139 | 53 | 47 | 81 | 85 |
| Scioto River at Higby | 5,131 | 2,092 | 46 | 57 | 80 | 94 |
| Stillwater River at Pleasant Hill | 503 | 127 | 32 | 40 | 41 | 65 |

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - - Current

STREAMFLOW during December was below normal throughout most of the state with only a few drainage basins in extreme eastern Ohio having above normal flows. Flows during December increased seasonally from the flows recorded during November.

Streamflows at the beginning of the month were noticeably below normal throughout the state. Most drainage basins had their lowest flows for the month on December 4, but a few basins had slightly lower flows at the end of the month. Streamflows increased noticeably during the middle of December following most of the month's precipitation which fell during two storm periods. Most basins recorded their greatest flows for the month on or about December 11 following several days with precipitation. Drainage basins in northwestern and

north-central Ohio had their greatest flows for the month on December 18 following storms in that area of the state. Flows declined through the end of the month responding to the lack of precipitation and at the end of the month were once again below normal throughout the state.

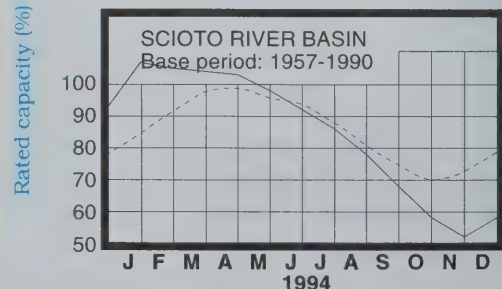
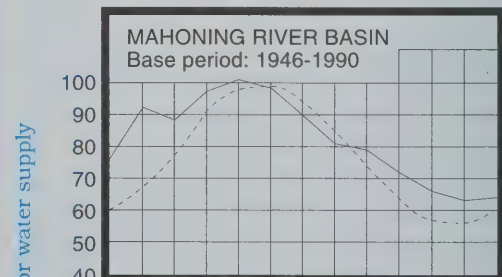
Streamflow for the 1994 calendar year was below normal throughout most of Ohio with only a few basins in the extreme eastern area of the state having slightly above normal flows (see Mean Stream Discharge table, past 12 months column). The year started with moderate flooding throughout much of Ohio following the January thaw with ice jams compounding the problems along the Ohio River and near Lake Erie. April showers resulted in some moderate flooding, and during the summer months, locally severe thunderstorms caused isolated small stream and urban flooding, especially during August. Generally, flows were noticeably below normal throughout the fall months as unusually dry conditions persisted throughout the state.

RESERVOIR STORAGE for water supply during December increased in both the Mahoning and Scioto river basins. Month-end storage remained slightly above normal in the Mahoning basin index reservoirs and noticeably below normal in the Scioto basin index reservoirs.

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 64 percent of rated capacity for water supply compared with 63 percent for last month and 75 percent for December 1993. Month-end storage in the Scioto basin index reservoirs was 58 percent of rated capacity for water supply compared with 52 percent for last month and 93 percent for December 1993.

Surface water supplies during 1994 were adequate throughout the state. Storage was above normal during the winter and early spring months but fell to below normal levels by the start of summer as a result of dry conditions in May and most of June. Reservoir storage in the Mahoning basin recovered to slightly above normal levels by the fall where it remained through the end of the year. Reservoir storage in the Scioto basin remained at below normal levels through the end of the year and at the end of November, was at its lowest month-end level since January 1988.

RESERVOIR STORAGE FOR WATER SUPPLY



Based on daily lowest level in feet below land-surface datum

GROUND WATER LEVELS during December were stable during the first half of the month and showed some improvement during the second half in most aquifers. However, the net changes from November's to December's levels were less than usually observed.

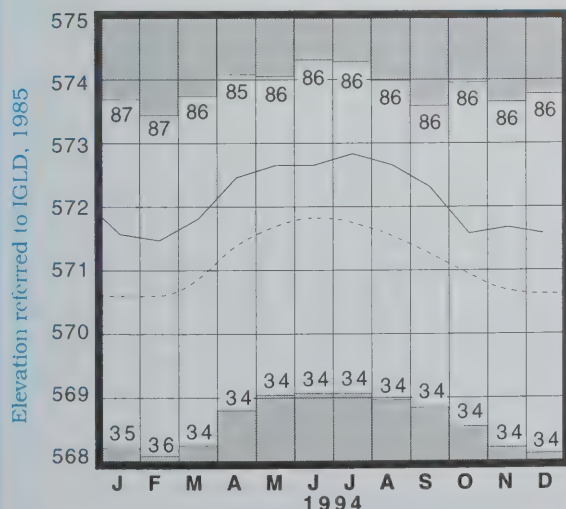
Ground water storage continues to remain at noticeably below normal levels, especially in the eastern half of the state where levels are at or near record-low levels. As an example, index observation well F-1 (Fairfield County), representing sandstone aquifers in eastern and southeastern Ohio, recorded its lowest December level ever observed and index observation well Tu-1 (Tuscarawas County), representing sand and gravel aquifers in eastern and northeastern Ohio, reached its lowest level ever observed. Both observation wells have more than 47 years of record.

Ground water supplies during 1994 were adequate throughout most of Ohio. The year started with ground water storage at below normal levels in the eastern half of the state and at near or slightly above normal in the western half. Recharge during the winter months was less than usually expected due to the below normal precipitation and frozen ground conditions that reduced recharge rates. April's above normal precipitation was beneficial, but noticeably below normal precipitation in May and most of June brought an abrupt end to the recharge season. Ground water levels declined seasonally through the summer months. An unusually dry fall in most areas of the state eliminated any hope of an early start to the current recharge season. At the end of 1994, ground water levels are noticeably lower than those of a year ago. Ground water storage throughout the state is at below normal levels and at or near record-low levels in many areas, especially in the eastern half of the state. Water supply managers with ground water sources should closely monitor their specific situations throughout the current recharge season.

LAKE ERIE level declined slightly during December. The mean level was 571.59 feet (IGLD-1985), 0.09 foot below last month's mean level and 0.96 foot above normal. This month's level is 0.29 foot lower than the December 1993 level and 2.39 feet above Low Water Datum.

The level of Lake Erie remained above normal throughout 1994. Its level is predicted to remain above normal for the foreseeable future based on the present condition of the lake basin and anticipated future weather conditions. The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during December averaged 2.7 inches, 0.1 inch above normal. The entire Great Lakes basin averaged 1.3 inches of precipitation in December, 1.1 inches below normal. For calendar year 1994, the Lake Erie basin averaged 32.7 inches of precipitation, 2.2 inches below normal and the entire Great Lakes basin averaged 31.4 inches, 0.9 inch below normal.

LAKE ERIE LEVELS at Fairport

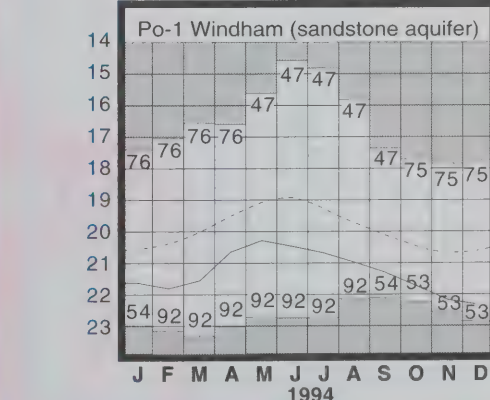
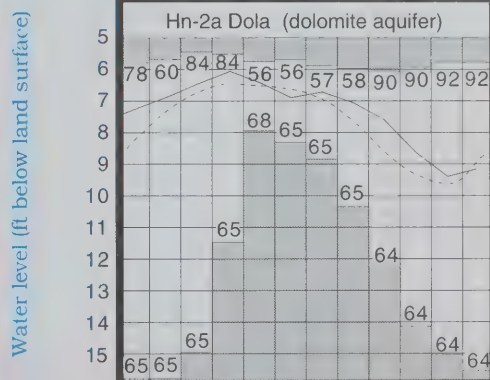
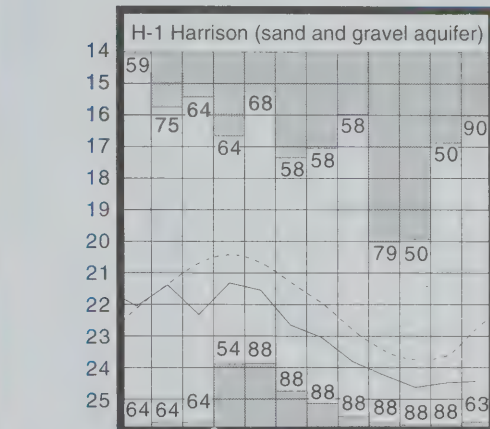


Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

inches, 6.91 inches below normal (see Precipitation table, departure from normal, past 12 months column). An isohyetal map and regional averages with percentages of normal precipitation for the 1994 calendar year appear below. McArthur (Vinton County) reported the greatest amount of precipitation for the year, 52.57 inches. Bowling Green (Wood County) reported the least amount, 24.48 inches.

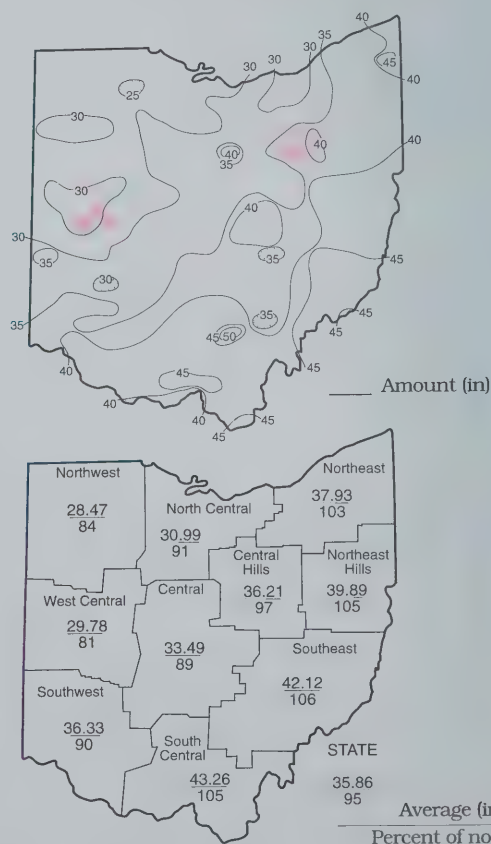
The 1994 calendar year started with record-setting low temperatures in January. Precipitation was above normal during January, but below normal in February and March. April precipitation was above normal, but droughtlike conditions developed during May and the first half of June. Timely rains during late June and in July and August guaranteed a satisfactory growing season for most of Ohio's agricultural crops. Unusually dry conditions returned to the state in September and October. September was the fifth driest September and October the tenth driest October on record. Slightly above normal precipitation during November and near normal precipitation during December helped ease the drought conditions in most areas of the state. At the end of the year, the West Central Region was classified as being in a moderate drought and the Northwest Region in a mild drought. The remainder of the state was near normal (see precipitation table, Palmer Drought Severity Index).

SUMMARY

Precipitation in Ohio was near normal during December. Streamflow was below normal in most areas of the state. Reservoir storage increased slightly and was near normal in most areas, but remained at noticeably below normal levels in the central area of the state. Ground water storage started to improve after the middle of the month, but continued to remain at below normal levels, especially in the eastern half of the state. Lake Erie level declined slightly and was 0.96 foot above the long-term December average.

Precipitation for the 1994 calendar year was below normal in the western, central and north-central areas of the state and above normal in the eastern and south-central areas. Streamflow was below normal in nearly all drainage basins. Surface water supplies were adequate, but fell to below normal levels statewide during the summer months. In the central area of the state, reservoir storage remained at below normal levels through the end of the year. Ground water supplies were adequate but fell to below normal levels statewide by the year's end most noticeably in the eastern half of the state where they were at or near record-low levels. Lake Erie was above its long-term average throughout the year.

PRECIPITATION - 1994 CALENDAR YEAR



ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index;

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Frances S. Buchholzer
Director

Michele Willis
Acting Chief

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Jan. 1995

PWL



MONTHLY WATER INVENTORY REPORT FOR OHIO

January 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

MR 09 '95

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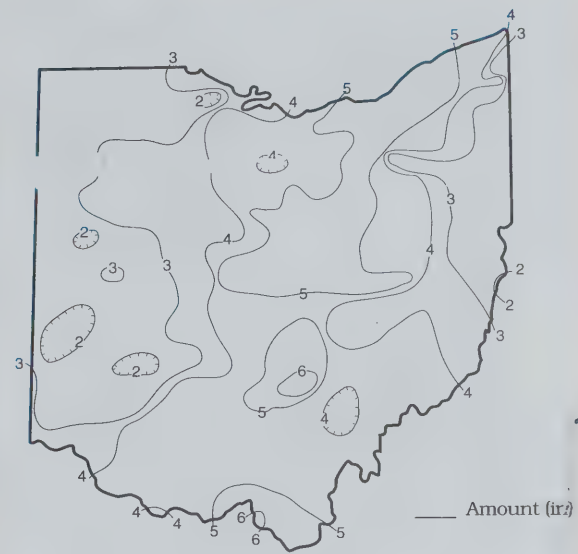
PRECIPITATION for January was above normal throughout most of Ohio but was below normal in the West Central and Southwest regions. The state average was 3.84 inches, 1.08 inches above normal. Regional averages ranged from 5.04 inches, 2.34 inches above normal, for the Central Hills Region to 2.32 inches, 0.35 inch below normal, for the West Central Region. Enterprise (Hocking County) reported the greatest amount of precipitation for the month, 6.67 inches. Xenia (Greene County) reported the least amount, 1.64 inches.

Precipitation during January fell as both rain and snow. Precipitation fell during every week of the month and on most weekends. The largest storms occurred after mid-month. Most areas of the state received about 0.5 inch of precipitation during the first week of the month, much of it falling as snow. Temperatures warmed the following week. Storms began to cross the state on January 14 and continuing through January 16 with the precipitation falling as rain in most areas of Ohio. A large area extending from central up through northeastern Ohio received between 2 and 3 inches of precipitation during this period with the storm missing almost the entire western area of the state. Minor flooding was reported in some areas following this period. Winter weather finally made its debut in Ohio during the last ten days of the month. Storms started on January 20 as rain, but quickly changed to snow which continued to fall through January 22. Many areas in central, north-central and northeastern Ohio received significant snowfall, the first of the season for many locations. The remainder of the month was rather dry in many areas of the state, but extreme southern Ohio had snow storms during January 28-29 and northeastern Ohio had snow storms and squalls throughout this period.

Precipitation for the 1995 water year is slightly above normal throughout most of Ohio but remains below normal in the West Central and Southwest regions. The state average is 10.41 inches, 0.08 inch above normal. Regional averages range from 11.60 inches, 0.26 inch above normal, for the South Central Region to 8.11 inches, 1.93 inches below normal, for the West Central Region. The above normal precipitation in most of Ohio during January resulted in the first significant improvement in ground water storage during the 1995 water year recharge period. Near normal precipitation and other climatic conditions during the next several months is needed to continue this improvement for both surface and ground water supplies.

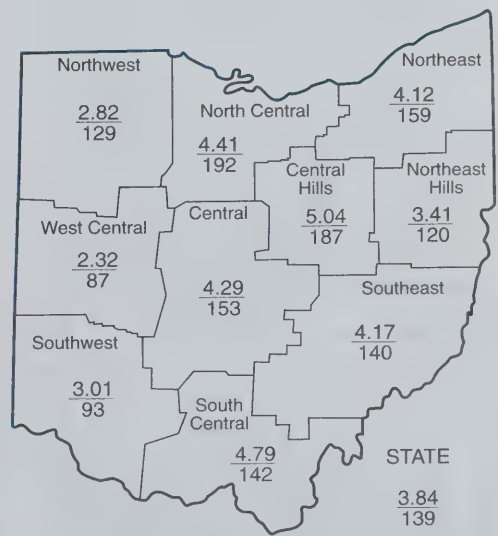
The 1995 calendar year is off to a good start in most areas of Ohio as far as precipitation is concerned. Near normal precipitation distributed evenly throughout the year will provide the necessary benefits for water supplies, agriculture, recreation and many other social and economic activities.

PRECIPITATION JANUARY 1995



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.64 | +1.74 | -1.46 | -4.96 | -5.60 | -0.6 |
| North Central | +2.11 | +2.76 | +1.36 | -1.36 | -2.05 | +0.6 |
| Northeast | +1.53 | +1.79 | +2.17 | +1.62 | +5.63 | +2.2 |
| West Central | -0.35 | -0.29 | -3.50 | -7.51 | -0.62 | -2.2 |
| Central | +1.48 | +1.70 | -0.39 | -3.36 | +0.43 | -0.2 |
| Central Hills | +2.34 | +2.68 | +1.45 | +0.46 | +2.57 | +1.0 |
| Northeast Hills | +0.58 | +1.91 | +1.05 | +1.15 | +4.33 | +0.8 |
| Southwest | -0.22 | -0.10 | -3.11 | -4.44 | -4.28 | +0.1 |
| South Central | +1.42 | +1.54 | -0.57 | +2.40 | -0.93 | +0.6 |
| Southeast | +1.20 | +1.57 | +0.16 | +1.88 | +2.27 | +0.6 |
| State | +1.08 | +1.54 | -0.28 | -1.40 | +0.21 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,284 | 217 | 93 | 91 | 91 |
| Great Miami River at Hamilton | 3,630 | 1,829 | 62 | 33 | 41 | 70 |
| Huron River at Milan | 371 | 534 | 150 | 94 | 97 | 82 |
| Killbuck Creek at Killbuck | 464 | 803 | 213 | 103 | 99 | 97 |
| Little Beaver Creek near East Liverpool | 496 | 498 | 100 | 108 | 111 | 95 |
| Maumee River at Waterville | 6,330 | 5,474 | 174 | 60 | 49 | 67 |
| Muskingum River at McConnelsville | 7,422 | 12,820 | 162 | 109 | 102 | 104 |
| Scioto River near Prospect | 567 | 569 | 168 | 68 | 65 | 79 |
| Scioto River at Higby | 5,131 | 7,310 | 197 | 88 | 89 | 94 |
| Stillwater River at Pleasant Hill | 503 | 217 | 60 | 33 | 34 | 52 |

STREAMFLOW during January was above normal throughout most of Ohio but below normal in the western and southwestern areas of the state. Flows in some southeastern, east-central and northeastern Ohio drainage basins were high enough to be considered excessive. Flows in most drainage basins during January increased noticeably from the flows recorded during December.

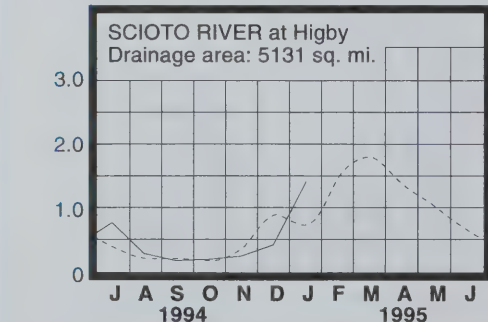
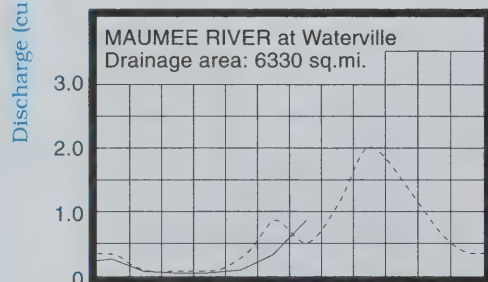
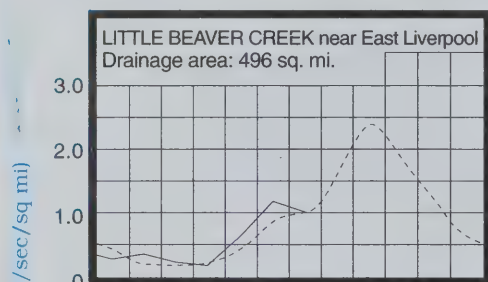
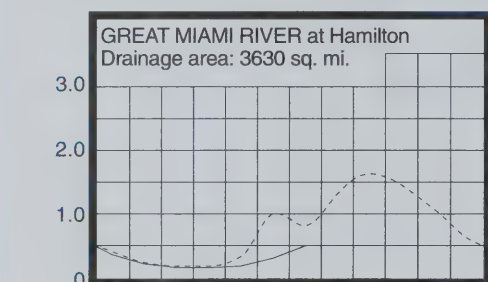
Streamflows at the beginning of January were markedly below normal throughout the state. Lowest flows in January for most areas of the state occurred during the first five days of the month, a few days later in some locations. Streamflows increased rapidly after mid-month following widespread precipitation with the greatest amounts falling in the eastern two-thirds of the state.

Drainage basins in the eastern two-thirds of Ohio recorded their greatest flows for the month during January 16-19. Minor flooding was reported during January 16-17 in some southern and southeastern Ohio drainage basins. Greatest flows in the western one-third of the state occurred during January 20-22 with some minor flooding also reported in northwestern and southwestern Ohio during this period. Flows declined through the end of the month and at the month's end were above normal in the eastern, northwestern and south-central drainage basins but below normal in the northeastern, southwestern and western drainage basins.

RESERVOIR STORAGE for water supply during January increased in both the Mahoning and Scioto river basins. Month-end storage remained at above normal levels in the Mahoning basin reservoirs. In the Scioto basin reservoirs, storage rose to above normal levels for the first time since late spring 1994.

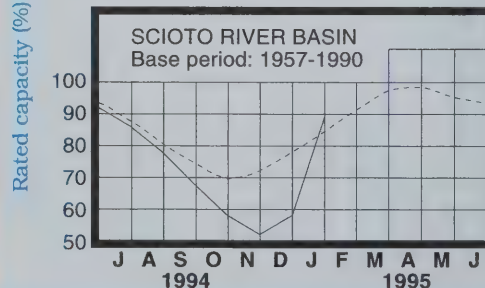
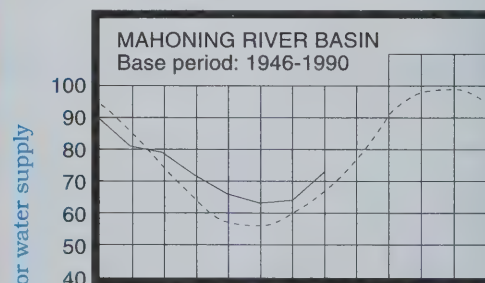
Reservoir storage at the end of January in the Mahoning basin index reservoirs was 73 percent of rated capacity for water supply compared with 64 percent for last month and 92 percent for January 1994. Month-end storage in the Scioto basin index reservoirs was 89 percent of rated capacity for water supply compared with 58 percent for last month and 107 percent for January 1994.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - - Current _____

Based on daily lowest level in feet below land-surface datum

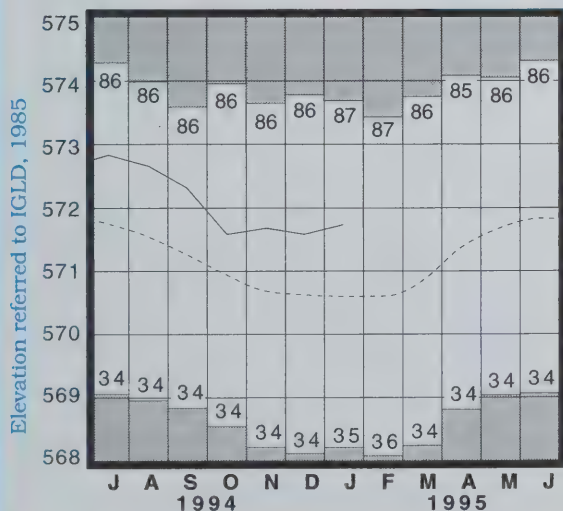
GROUND WATER LEVELS during January rose in all aquifers throughout Ohio. Net changes from December's to January's levels were less than that usually observed in most aquifers, but were slightly greater than usually observed in some consolidated aquifers. This was the first month in the 1995 water year recharge period with any significant improvement in ground water storage.

Ground water levels were stable or declined slightly during the first half of the month and then rose steadily during the second half especially in most of the shallower aquifers. Deeper aquifers generally had a gradual rise throughout the month. Current ground water levels continue to remain lower than they were a year ago ranging from about 0.5 foot to more than 4 feet below the January 1994 levels. Ground water storage also continues to remain at noticeably below normal levels, especially in the eastern half of the state. As an example, index observation well F-1 (Fairfield County), representing sandstone aquifers in eastern and southeastern Ohio, recorded its lowest January level ever observed and index observation well Tu-1 (Tuscarawas County), representing sand and gravel aquifers in eastern and northeastern Ohio, reached its lowest level ever observed. Both of these observation wells showed some improvement during the second half of the month after reaching these record-low levels. Both wells have more than 47 years of record.

It appears that ground water storage has finally bottomed out and turned the corner showing the first significant improvement for the 1995 water year. Near normal precipitation and other climatic conditions will be needed to continue and sustain this improvement. Several months remain with the potential to provide the conditions favorable for ground water recharge. Water supply managers with ground water sources should continue to closely monitor their specific conditions throughout the current recharge season.

LAKE ERIE level rose slightly during January. The mean level was 571.72 feet (IGLD-1985), 0.13 foot above last month's mean level and 1.12 feet above normal. This month's level is 0.13 foot higher than the January 1994 level and 2.52 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport

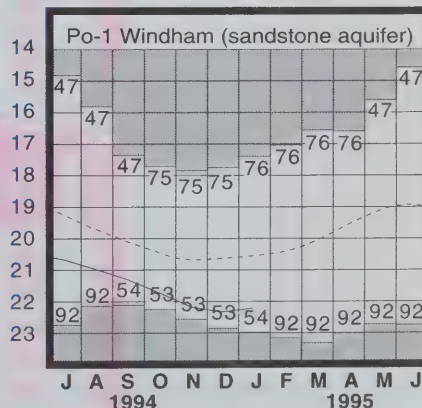
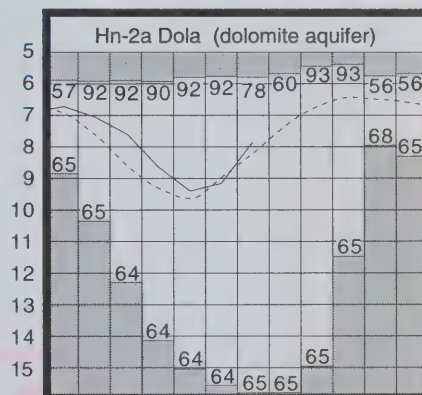
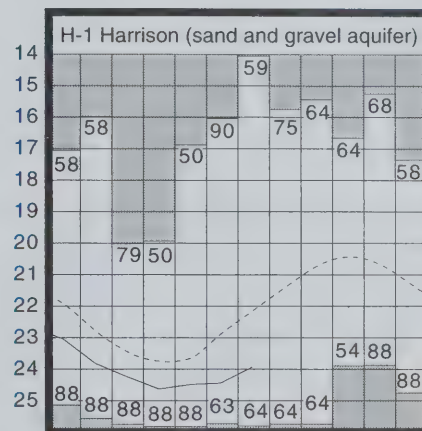


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - Current ———

SUMMARY

Precipitation during January was above normal in most of Ohio but below normal in the western and southwestern areas. Streamflow was above normal in all but the western and southwestern Ohio drainage basins. Reservoir storage increased to above normal levels. Ground water storage showed improvement but remains at below normal levels in most areas of the state. Lake Erie level rose slightly and was 1.12 feet above the long-term January average.

NOTES AND COMMENTS

NEW DIRECTOR AT ODNR

Governor George V. Voinovich recently announced the appointment of Donald C. Anderson as director of the Ohio Department of Natural Resources (ODNR). He follows Frances S. Buchholzer who stepped down January 9, 1995 after four productive years as ODNR director.

Donald C. Anderson brings a depth of experience in conservation, natural resources and public administration to the Director's office, including 15 years' previous service with ODNR, the past four years as assistant director.

Anderson originally joined the department in 1972 and became chief of ODNR's fiscal division in 1974. In 1981 he was named deputy director of administration, responsible for personnel and fiscal management for the agency. He left state government in 1982 to join an international natural resources consulting firm. He rejoined ODNR in February 1991 as assistant director.

A native of Toledo, Anderson is a graduate of The Ohio State University with a bachelor's degree in history (1967) and master's degree in public administration (1973). Prior to joining ODNR, he served as a communications officer in the U.S. Air Force from 1967 to 1971, attaining the rank of captain.

He and his wife, Sally Hough, have four children and reside in Worthington.

DIVISION OF WATER ENGINEER NAMED PRESIDENT ELECT OF ASDSO

George Mills, administrator of the Division of Water's Water Engineering Section, is the Association of State Dam Safety Officials (ASDSO) new president elect. He will begin serving as president in September 1995. Mr. Mills has been on the ASDSO Board of Directors since 1992. Ohio was a charter member of ASDSO when it was organized in 1984.

The dam safety program in Ohio is considered one of the finest dam safety programs in the country. As administrator, George directs a staff that has many responsibilities including regulatory jurisdiction for about 1800 dams, issuing permits for new dam construction, providing technical assistance for repairs during emergency situations, and the hydraulic and maintenance operations for Ohio's historic canal system. In addition to his responsibilities at the Division of Water, George helped to establish the National Performance of Dams Center at Stanford University.

Mr. Mills, a graduate of The Ohio State University in agricultural engineering, has worked for the Division of Water since 1968. He is a Vietnam veteran where he served in the U. S. Army.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Consergency District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

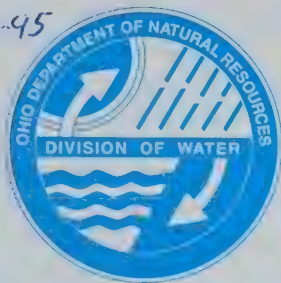
Donald C. Anderson
Director

Michelle Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

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February 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

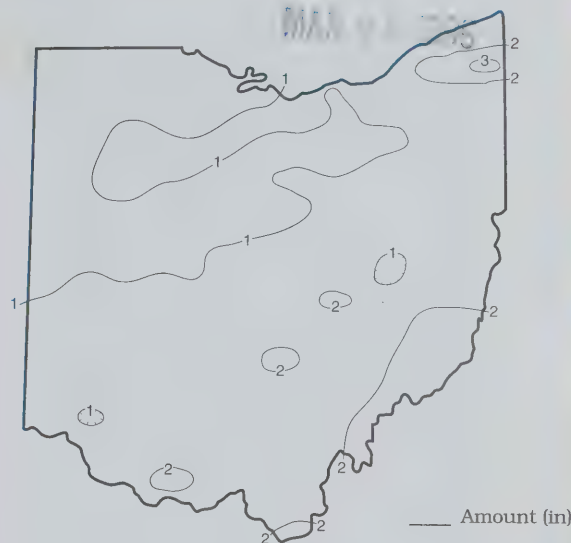
PRECIPITATION for February was noticeably below normal throughout Ohio. The state average was 1.38 inches, 0.86 inch below normal. Regional averages ranged from 2.01 inches, 0.48 inch below normal, for the Southeast Region to 0.78 inch, 1.06 inches below normal, for the Northwest Region. Andover (Ashtabula County) reported the greatest amount of precipitation for the month, 3.96 inches, the only location reporting more than three inches of precipitation in February. Montpelier (Williams County) reported the least amount of February precipitation, only 0.37 inch.

Precipitation fell mostly as snow during the first half of February and as rain during the second half. Total precipitation during the first half of the month was nominal in northwestern Ohio increasing to only about 0.5 inch in the southeastern area of the state. Much of the snow that fell during late January and the first half of February remained on the ground as temperatures remained below normal throughout this period. Warmer air moved into the state at mid-month which melted much of the snow on the ground and also brought rain showers. Although northwestern Ohio received little precipitation, some areas in southern and southeastern Ohio reported more than 1 inch of rain during February 15-16. The most widespread precipitation for the month fell during February 27-28 when most areas of the state received between 0.5 and 1 inch of precipitation.

Precipitation for the 1995 calendar year is generally above normal in the eastern two-thirds of the state and below normal in the western one-third. The state average is 5.22 inches, 0.22 inch above normal. Regional averages range from 6.64 inches, 0.49 inch above normal, for the South Central Region to 3.29 inches, 1.49 inches below normal, for the West Central Region.

Precipitation for the 1995 water year is below normal throughout most of Ohio, but slightly above normal in the north-central and northeastern areas of the state. The state average is 11.79 inches, 0.79 inch below normal. Regional averages range from 13.45 inches, 0.67 inch below normal, for the South Central Region to 9.08 inches, 3.07 inches below normal, for the West Central Region. The 1995 water year recharge season has not been favorable for significant improvement in ground water storage. Only a few months remain with the potential to produce the climatic conditions necessary for the much needed ground water recharge. Near normal precipitation will be required to sustain any improvement that has been observed during the past two months.

PRECIPITATION FEBRUARY 1995

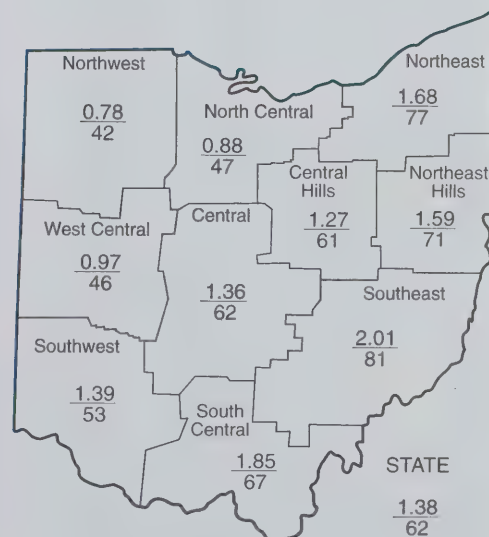


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.06 | -0.18 | -2.64 | -5.38 | -6.46 | -1.1 |
| North Central | -0.99 | +1.50 | -0.81 | -1.68 | -2.97 | -1.4 |
| Northeast | -0.49 | +1.14 | -0.59 | +1.94 | +5.22 | +0.7 |
| West Central | -1.14 | -1.82 | -4.72 | -7.91 | -1.78 | -2.5 |
| Central | -0.85 | +0.50 | -1.71 | -3.61 | -0.42 | -0.7 |
| Central Hills | -0.82 | +1.66 | -0.96 | +0.20 | +2.09 | -0.6 |
| Northeast Hills | -0.64 | -0.08 | -1.15 | +0.77 | +3.50 | -0.3 |
| Southwest | -1.23 | -1.75 | -4.62 | -4.88 | -5.58 | -1.1 |
| South Central | -0.93 | +0.53 | -1.31 | +0.39 | -1.56 | -1.0 |
| Southeast | -0.48 | +0.73 | -1.09 | +1.41 | +1.97 | -0.2 |
| State | -0.86 | +0.23 | -1.95 | -1.86 | -0.56 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



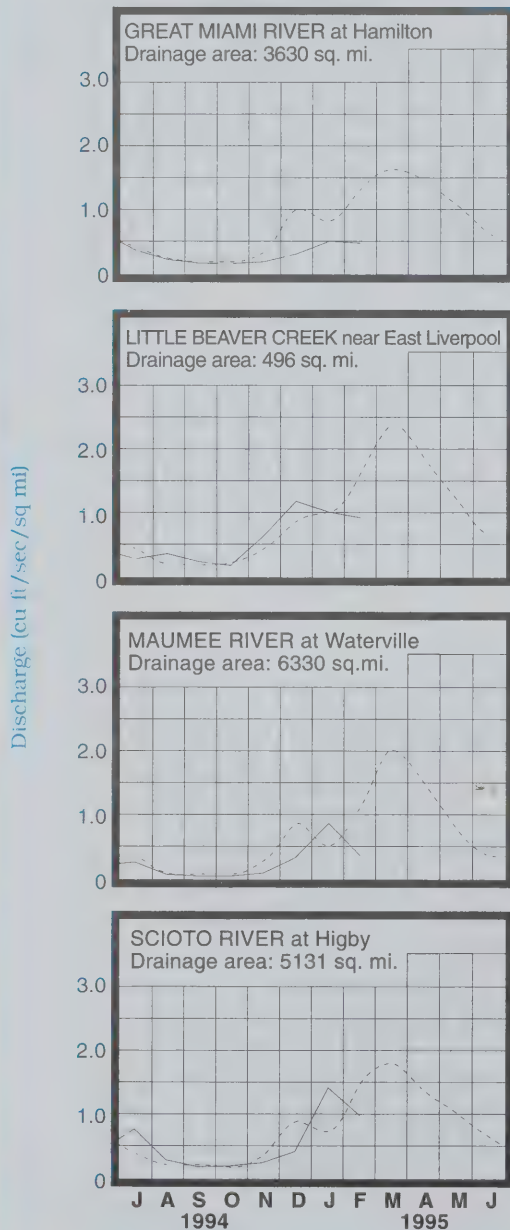
Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 920 | 47 | 90 | 73 | 81 |
| Great Miami River at Hamilton | 3,630 | 1,697 | 35 | 39 | 37 | 63 |
| Huron River at Milan | 371 | 325 | 70 | 77 | 74 | 76 |
| Killbuck Creek at Killbuck | 464 | 323 | 46 | 84 | 74 | 85 |
| Little Beaver Creek near East Liverpool | 496 | 455 | 54 | 83 | 83 | 88 |
| Maumee River at Waterville | 6,330 | 2,226 | 32 | 54 | 44 | 58 |
| Muskingum River at McConnellsville | 7,422 | 7,998 | 66 | 96 | 85 | 91 |
| Scioto River near Prospect | 567 | 354 | 53 | 66 | 54 | 70 |
| Scioto River at Higby | 5,131 | 5,040 | 67 | 83 | 76 | 84 |
| Stillwater River at Pleasant Hill | 503 | 146 | 26 | 31 | 26 | 43 |

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

STREAMFLOW during February was below normal throughout Ohio. Flows in all but the central section of the state were low enough to be considered deficient. Contrary to the normal seasonal trend, February flows were less than the flows recorded during January.

Flows at the beginning of the month were below normal throughout the state. Generally, flows declined until mid-month at which time all drainage basins recorded their month's lowest flows. Flows increased slightly following precipitation and snowmelt on February 14-16. Many drainage basins in the southern half of the state had their greatest flows for February just after this period. Most drainage basins in the northern half of the state had their greatest flows for February at the end of the month following widespread precipitation during February 27-28.

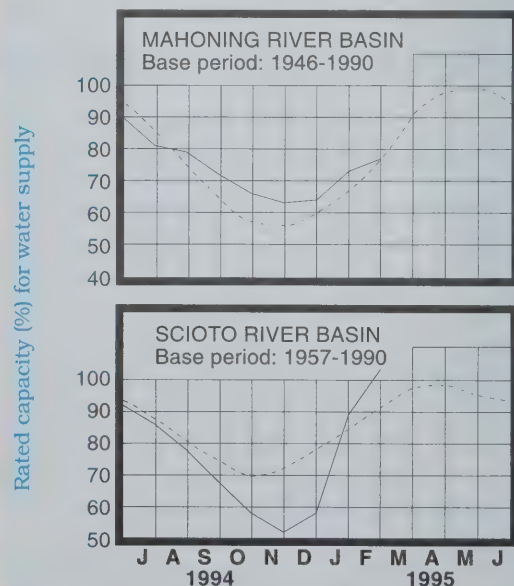
Flows at the end of the month were still below normal in the southern half of the state, but slightly above normal in the northern half.

RESERVOIR STORAGE for water supply during February increased in both the Mahoning and Scioto river basins. Month-end storage was at normal levels in the Mahoning basin reservoirs and at above normal levels in the Scioto basin reservoirs.

Reservoir storage at the end of February in the Mahoning basin index reservoirs was 77 percent of rated capacity for water supply compared with 73 percent for last month and 88 percent for February 1994. Month-end storage in the Scioto basin index reservoirs was 104 percent of rated capacity for water supply compared with 89 percent for last month and 105 percent for February 1994.

Surface water supplies are currently in good shape throughout most of Ohio. On-stream reservoirs are near or slightly above normal seasonal levels. Off-stream reservoirs are in a similar situation and there would appear to be ample time to select high-flow periods to fill reservoirs to capacity.

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current

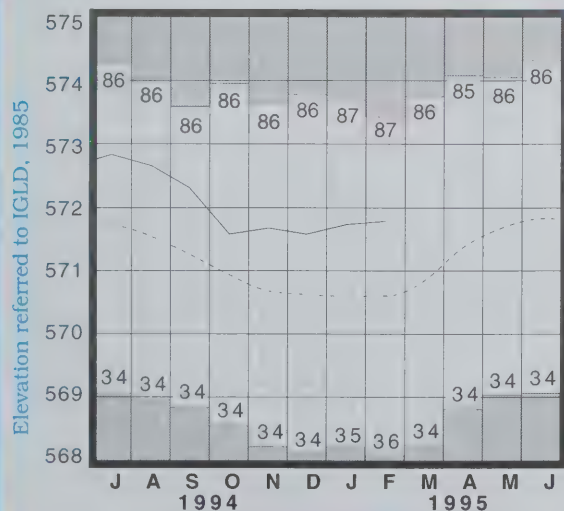
GROUND WATER LEVELS during February showed some improvement throughout the state. Much of the improvement can be related to delayed recharge from precipitation in January or to snowmelt and precipitation after the middle of February. Net changes from last month's levels were greater than usually observed in consolidated aquifers, but less than usually observed in unconsolidated aquifers. Ground water levels in most unconsolidated aquifers were stable or declined slightly during the first half of the month and then rose during the second half. In most consolidated aquifers, levels were stable or rose slightly during the first half of the month and then rose steadily during the second half.

Current ground water levels continue to remain noticeably lower than they were a year ago. Current levels range from slightly lower to nearly three feet lower than the levels observed in February 1994. Ground water storage also continues to remain at noticeably below normal levels in most areas of Ohio with the greatest departures being in the eastern half of the state. Only a few months remain with the potential to provide the climatic conditions favorable for ground water recharge. Water supply managers with ground water sources should continue to closely monitor their specific conditions throughout the current recharge season and the summer high-demand period.

LAKE ERIE level rose slightly during February. The mean level was 571.78 feet (IGLD-1985), 0.06 foot above last month's mean level and 1.18 feet above normal. This month's level is 0.29 foot above the February 1994 level and 2.58 feet above Low Water Datum.

The U.S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during February averaged 1.3 inches, 0.8 inch below normal. The entire Great Lakes basin averaged 1.4 inches of precipitation in February, 0.4 inch below normal. For calendar year 1995, the Lake Erie basin has averaged 5.1 inches of precipitation, 0.6 inch above normal and the entire Great Lakes basin has averaged 4.0 inches, 0.1 inch above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current - - - -

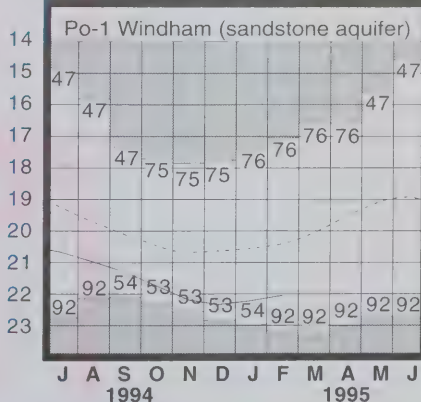
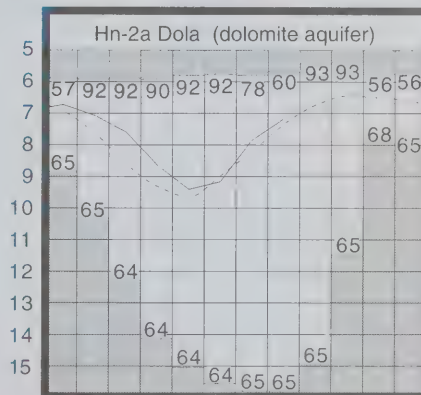
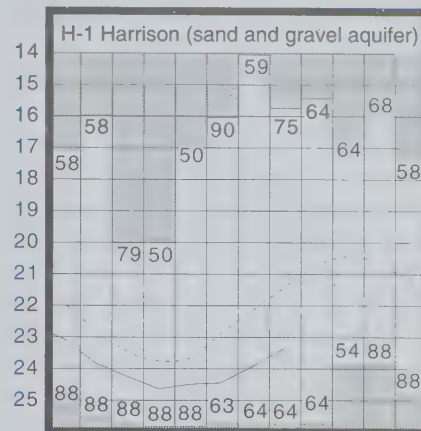
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.48 | -3.00 | +3.36 | -2.95 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.51 | -0.43 | +0.72 | -0.10 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.67 | -0.58 | +0.35 | -1.33 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.35 | -1.95 | +0.58 | -1.95 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.10 | +0.24 | +0.76 | -0.22 |
| Po-1 | Windham, Portage Co. | Sandstone | 22.05 | -1.65 | +0.16 | -0.23 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.03 | -2.89 | +0.70 | -1.61 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation was noticeably below normal throughout the state. Streamflow was deficient in all but the drainage basins in the mid-section of the state. Reservoir storage improved and was at or above normal seasonal levels. Ground water storage improved slightly, but remained at below normal levels throughout most of the state. Lake Erie level rose slightly and was 1.18 feet above the long-term February average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Clinton County

by James J. Schmidt

Ground Water Pollution Potential of Columbiana County

by Michael P. Angle

Ground Water Pollution Potential of Coshocton County

by Paul N. Spahr

Ground Water Pollution Potential of Montgomery County

by Michael Hallfrisch and Michael P. Angle

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
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MONTHLY WATER INVENTORY REPORT FOR OHIO

March 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during March was noticeably below normal throughout Ohio. The state average was 1.77 inches, 1.61 inches below normal. For the state as a whole, this ranks as the sixteenth driest March during the past 113 years. Regional averages ranged from 2.20 inches, 1.72 inches below normal, for the Southwest Region to 1.51 inches, 1.86 inches below normal, for the Central Region. Perintown (Clermont County) reported the greatest amount of precipitation for March, 2.96 inches; Huntington Tri-State Airport, West Virginia reported 3.04 inches which may indicate that more than 3 inches of precipitation fell in extreme southern Ohio. Congress (Wayne County) reported the least amount of precipitation during March, 0.73 inch.

Most of the precipitation during March fell during the first ten days of the month. The middle of the month was unusually dry and only nominal amounts of precipitation fell in most areas of the state during the last ten days of the month. Most of the month's precipitation for nearly all areas of Ohio fell during March 5-9. Scattered showers started on March 5 with heavier storms developing by March 7-8. The rain changed to snow on March 8. Most of Ohio received more than 1 inch of precipitation during this period with some areas reporting nearly 2 inches. Warm, dry weather dominated Ohio during the next ten days of the month. Scattered showers returned during March 20-23 and March 27-31. Precipitation totals during this period were generally around 0.25 inch with some areas reporting slightly more than 0.5 inch.

Precipitation for the 1995 calendar year is below normal throughout most of the state with only the North Central Region having slightly above normal precipitation. The state average is 6.99 inches, 1.39 inches below normal. Regional averages range from 8.52 inches, 1.72 inches below normal, for the South Central Region to 5.28 inches, 1.61 inches below normal, for the Northwest Region. So far in calendar year 1995, the North Central Region averages 7.06 inches of precipitation which is 0.03 inch above normal (see Precipitation table, departure from normal, past three months column).

Precipitation for the first half of the 1995 water year is below normal throughout the state. The state average is 13.56 inches, 2.39 inches below normal. Regional averages range from 15.33 inches, 2.88 inches below normal, for the South Central Region to 11.11 inches, 4.30 inches below normal, for the West Central Region (see Precipitation table, departure from normal, past six months column). Precipitation during the 1995 water year recharge period has not been favorable for ground water supplies. The fall months (September, October, November) were noticeably dry ranking as the tenth driest fall during the past 100 years. Precipitation was near or slightly above normal during December and January, but noticeably dry weather returned in February and March. Ample precipitation during April could still benefit ground

(continued on back)

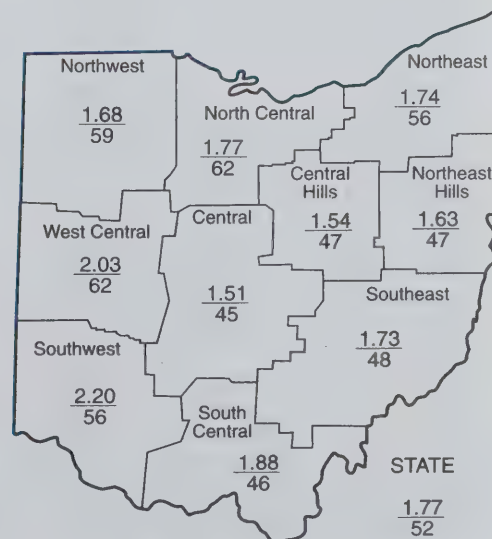
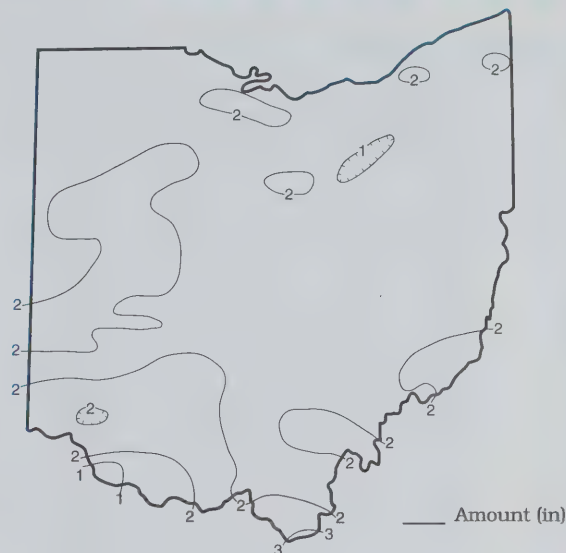
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.19 | -1.61 | -1.91 | -5.11 | -7.36 | -1.9 |
| North Central | -1.09 | +0.03 | -0.78 | -1.43 | -4.43 | -1.0 |
| Northeast | -1.37 | -0.33 | -1.32 | +0.74 | +2.85 | -0.6 |
| West Central | -1.23 | -2.72 | -4.30 | -7.15 | -2.01 | -2.6 |
| Central | -1.86 | -1.23 | -2.39 | -4.19 | -2.33 | -1.1 |
| Central Hills | -1.72 | -0.20 | -1.37 | -0.72 | -0.27 | -1.1 |
| Northeast Hills | -1.82 | -1.88 | -2.30 | -1.93 | +0.99 | -1.3 |
| Southwest | -1.72 | -3.17 | -4.47 | -4.79 | -6.31 | -1.5 |
| South Central | -2.21 | -1.72 | -2.88 | -3.43 | -3.77 | -1.1 |
| Southeast | -1.89 | -1.17 | -2.27 | -1.23 | -0.79 | -1.2 |
| State | -1.61 | -1.39 | -2.39 | -2.91 | -2.31 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION MARCH 1995



NY 3 '95

Average (in)
Percent of normal

ILLINOIS STATE WATER SURVEY LIBRARY COPY

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,437 | 75 | 90 | 76 | 76 |
| Great Miami River at Hamilton | 3,630 | 3,874 | 65 | 48 | 43 | 64 |
| Huron River at Milan | 371 | 406 | 58 | 75 | 72 | 76 |
| Killbuck Creek at Killbuck | 464 | 554 | 59 | 91 | 86 | 81 |
| Little Beaver Creek near East Liverpool | 496 | 633 | 54 | 64 | 82 | 75 |
| Maumee River at Waterville | 6,330 | 7,698 | 60 | 64 | 57 | 59 |
| Muskingum River at McConnelsville | 7,422 | 10,650 | 66 | 91 | 87 | 86 |
| Scioto River near Prospect | 567 | 834 | 86 | 77 | 63 | 76 |
| Scioto River at Higby | 5,131 | 7,218 | 79 | 81 | 74 | 85 |
| Stillwater River at Pleasant Hill | 503 | 482 | 58 | 38 | 34 | 46 |

STREAMFLOW during March was noticeably below normal throughout Ohio. Flows in the eastern and west-central Ohio drainage basins were low enough to be considered deficient. Flows during March were greater than the flows recorded during February throughout most of the state.

Flows at the beginning of the month were above normal in the central and northeastern areas of the state but below normal elsewhere. Flows declined during the first week of March but began to rise following the month's greatest precipitation and snowmelt during March 5-9. The greatest flows in March occurred during or just after this period. Flows generally declined through the end of the month at which time the lowest flows in March were observed. Streamflows at the end of March

were noticeably below normal throughout the state.

Streamflow during the past six months has been below normal throughout the state (see Mean Stream Discharge table, percent of normal, past six months column). Flows have been the most noticeably below normal in the western half of Ohio where the precipitation during the same period has been the most deficient. In spite of the below normal streamflows, surface water supplies in both on and off-stream reservoirs remain adequate throughout Ohio.

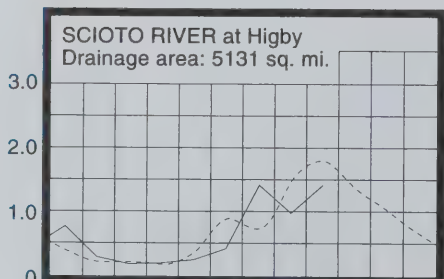
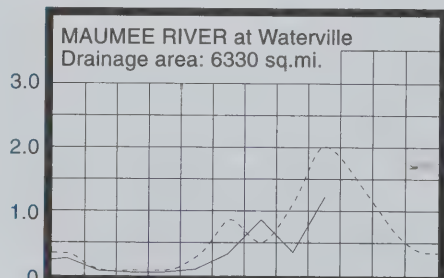
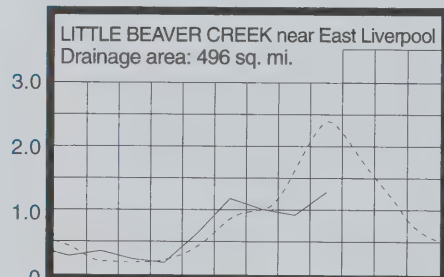
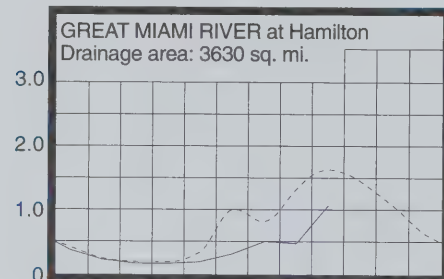
RESERVOIR STORAGE for water supply during March increased in the Mahoning basin reservoirs and decreased slightly in the Scioto basin reservoirs. Storage remained slightly above normal in the Scioto basin index reservoirs but fell to below normal in the Mahoning basin index reservoirs.

Reservoir storage at the end of March in the Mahoning basin index reservoirs was 85 percent of rated capacity for water supply compared with 77 percent for last month and 97 percent for March 1994. Month-end storage in the Scioto basin index reservoirs was 103 percent of rated capacity for water supply compared with 104 percent for last month and 104 percent for March 1994.

As mentioned above, surface water supplies remain adequate throughout Ohio. Most recreational and flood control reservoirs will fill to summer pool level during April. Off-stream reservoir managers may still have the opportunity to select high streamflow periods to fill or top-off reservoirs if necessary.

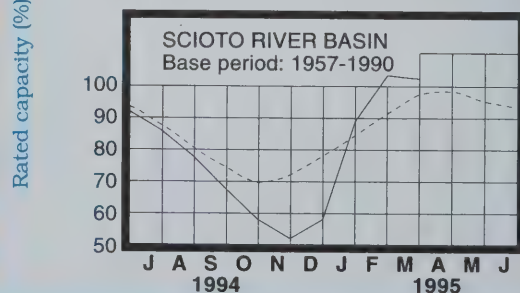
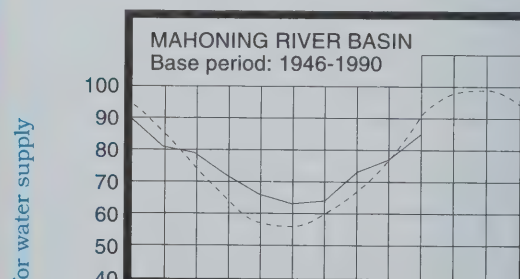
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal

Current

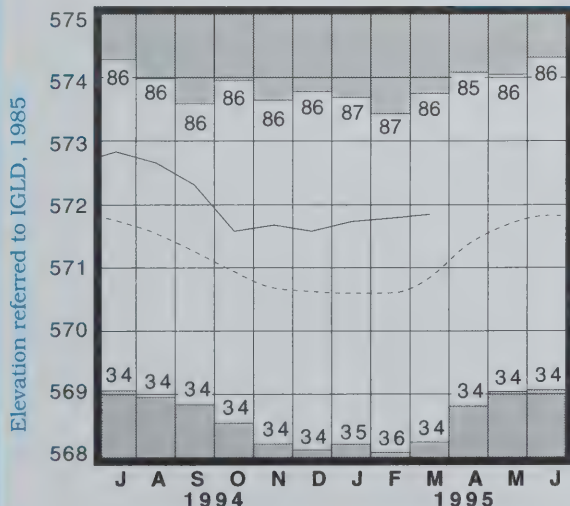
GROUND WATER LEVELS during March showed some improvement throughout the state. Much of the improvement can be related to the precipitation that fell during March 5-9. However, net changes from last month's levels were less than usually observed in most aquifers. Levels in most aquifers rose through the middle of the month and then declined through the end of the month; levels in some deeper aquifers, especially consolidated aquifers, gradually rose throughout the month.

Ground water storage continues to remain at noticeably below normal levels throughout most of the state. The greatest departures remain in the eastern half of the state, but some aquifers in west-central and southwestern Ohio are showing similar situations. Some recharge can be expected during April and if climatic conditions are favorable, even during May, but chances are poor that ground water storage will be able to reach normal levels before the summer season begins.

Current ground water levels also continue to remain noticeably lower than they were a year ago in most aquifers. Current levels in many areas of the state are also lower than those levels observed during March 1988, a period prior to the onset of severe early-summer drought conditions. This statement is not meant to be alarmist since many factors are involved in producing a drought; however, water supply managers with ground water sources are urged to closely monitor their situations throughout the remainder of the recharge season and the summer high-demand period. Levels should continue to be closely monitored through the fall months at least, or until factors favoring significant recharge are observed.

LAKE ERIE level rose slightly during March. The mean level was 571.85 feet (IGLD-1985), 0.07 foot above last month's mean level and 0.98 foot above normal. This month's level is 0.03 foot above the March 1994 level and 2.65 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

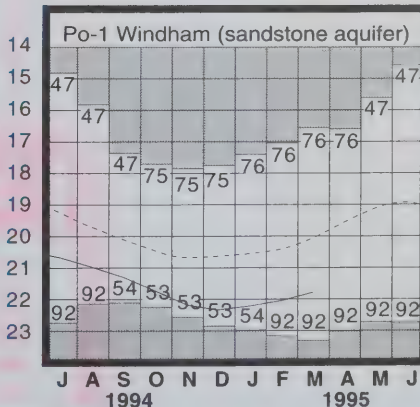
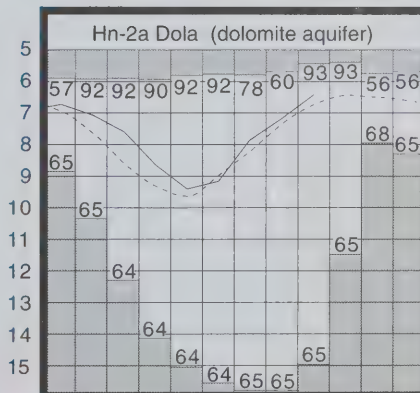
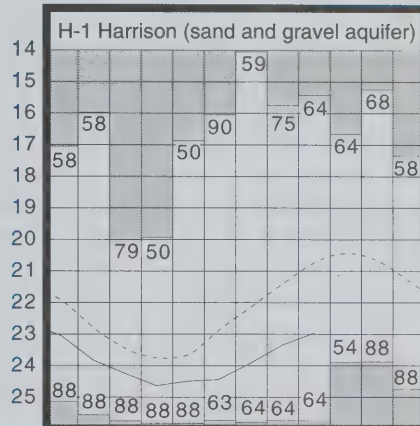
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.22 | -1.91 | +2.26 | -1.46 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.09 | -0.24 | +0.42 | +0.20 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.24 | -0.57 | +0.43 | -1.32 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.98 | -2.27 | +0.37 | -0.65 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.43 | +0.35 | +0.67 | +0.03 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.80 | -1.77 | +0.25 | -0.24 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.60 | -3.20 | +0.43 | -2.09 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Record high and low, year of occurrence

Normal - - - - Current - - - -

(continued from front page)

water supplies, but significant improvement is doubtful. Near normal precipitation, distributed evenly throughout the upcoming growing season will benefit agricultural crops and reduce demand on private and public water supplies, but do little to improve the ground water storage situation.

SUMMARY

Precipitation was noticeably below normal across Ohio with the March 1995 state average of 1.77 inches ranking as the sixteenth driest March during the past 113 years. Streamflow was below normal statewide. Reservoir storage increased in the Mahoning basin and decreased slightly in the Scioto basin. Ground water storage improved slightly but remains at noticeably below normal seasonal levels in most aquifers throughout the state. Lake Erie level rose slightly and was 0.98 foot above the long-term March average.

NOTES AND COMMENTS

WMAO ANNUAL SPRING MEETING

The Water Management Association of Ohio (WMAO) will offer an exciting opportunity for water resources professionals interested in dam safety, floodplain management, and stormwater management. WMAO's 1995 Spring Meeting will include three workshops focusing on these important issues. The meeting will be on May 9, 1995 at the Holiday Inn East in Columbus, Ohio. The registration cost is \$25.

The morning general session will include presentations on historic flooding problems and their effect on dam safety and floodplain management. It will also cover current efforts to reduce the impact of floods and to improve the quality of urban runoff. The afternoon workshops will focus individually on specific floodplain management, dam safety, and stormwater management topics.

Contact Patti Berenstein with the Division of Water at (614) 265-6731 for registration information.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conserance District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources



DIVISION OF WATER
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Apr.
1995



MONTHLY WATER INVENTORY REPORT FOR OHIO

RI
186

April 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

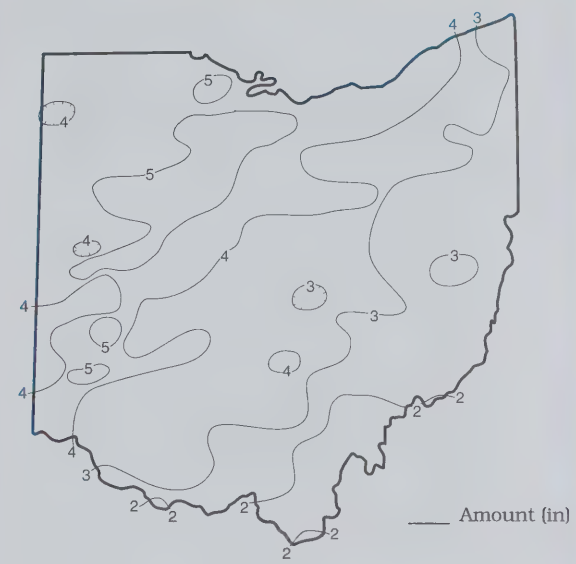
PRECIPITATION during April was above normal throughout most of Ohio but was below normal in the eastern and south-central areas of the state. The state average was 3.58 inches, 0.07 inch above normal. Regional averages ranged from 4.77 inches, 1.52 inches above normal, for the North Central Region to 2.27 inches, 1.47 inches below normal, for the South Central Region. Upper Sandusky (Wyandot County) reported the greatest amount of precipitation for the month, 5.88 inches. Gallipolis Locks and Dam (Gallia County) reported the least amount, 1.33 inches.

Precipitation during April fell almost entirely as rain with only minor amounts of snow reported. Precipitation for the month fell in a somewhat atypical pattern, being least in the south and east and generally increasing in amount to the north and west. Many areas of the state, especially the northern half, had numerous days with measurable precipitation. Showers and thunderstorms were widespread during April 8-12, especially in the northwestern area of the state where amounts of 2 inches were reported at some locations. Most of the heaviest storms occurred during April 9-10. Many areas in the central and western areas of the state had storms during April 21-23 with many locations reporting between 1 and 2 inches of rain. Most areas of the state reported little precipitation during the last week of the month.

Precipitation for the 1995 calendar year is below normal throughout most of the state but slightly above normal in the North Central and Central Hills regions. The state average is 10.57 inches, 1.32 inches below normal. Regional averages range from 11.83 inches, 1.55 inches above normal, for the North Central Region to 9.34 inches, 2.57 inches below normal, for the Northeast Hills Region.

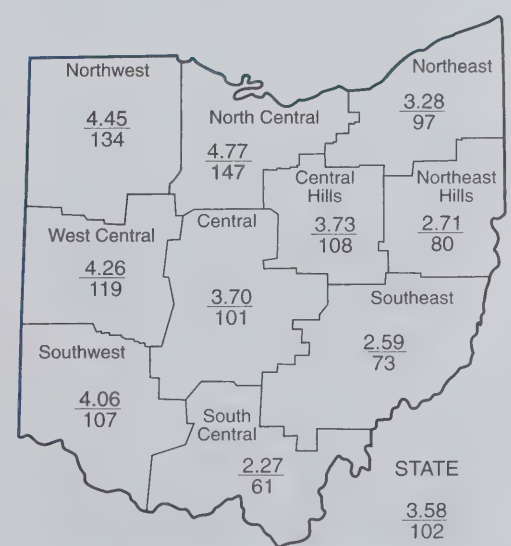
Precipitation for the 1995 water year is below normal throughout most of Ohio with only the North Central Region having slightly above normal precipitation. The state average is 17.14 inches, 2.32 inches below normal. Regional averages range from 18.07 inches, 1.43 inches below normal, for the Northeast Region to 15.37 inches, 3.62 inches below normal, for the West Central Region. The end of the 1995 water year recharge season is rapidly approaching. Conditions have not favored significant improvement in ground water storage. Adequate precipitation evenly distributed during the upcoming growing season will benefit agricultural crops and potentially reduce demand on public and private water supplies.

PRECIPITATION APRIL 1995



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.14 | -1.11 | +0.63 | -5.31 | -6.93 | -0.9 |
| North Central | +1.52 | -0.56 | +2.20 | -0.64 | -3.68 | +0.5 |
| Northeast | -0.11 | -1.97 | -0.18 | -1.35 | +2.55 | -0.5 |
| West Central | +0.68 | -1.69 | -1.98 | -6.52 | -2.15 | -2.5 |
| Central | +0.04 | -2.67 | -0.97 | -4.61 | -2.87 | -0.8 |
| Central Hills | +0.28 | -2.26 | +0.42 | -1.85 | -1.06 | -1.0 |
| Northeast Hills | -0.69 | -3.15 | -1.24 | -3.28 | +0.02 | -1.2 |
| Southwest | +0.25 | -2.70 | -2.80 | -7.07 | -6.85 | -1.6 |
| South Central | -1.47 | -4.61 | -3.07 | -6.15 | -4.50 | -1.7 |
| Southeast | -0.95 | -3.32 | -1.75 | -3.49 | -1.75 | -1.6 |
| State | +0.07 | -2.40 | -0.86 | -4.02 | -2.69 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

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MY 25 '95

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,255 | 88 | 68 | 79 | 70 |
| Great Miami River at Hamilton | 3,630 | 4,245 | 80 | 53 | 50 | 56 |
| Huron River at Milan | 371 | 715 | 138 | 81 | 82 | 74 |
| Killbuck Creek at Killbuck | 464 | 422 | 56 | 55 | 75 | 65 |
| Little Beaver Creek near East Liverpool | 496 | 406 | 45 | 53 | 72 | 63 |
| Maumee River at Waterville | 6,330 | 12,092 | 126 | 73 | 71 | 58 |
| Muskingum River at McConnellsville | 7,422 | 7,905 | 52 | 63 | 81 | 72 |
| Scioto River near Prospect | 567 | 1,344 | 165 | 87 | 81 | 80 |
| Scioto River at Higby | 5,131 | 5,876 | 83 | 67 | 71 | 75 |
| Stillwater River at Pleasant Hill | 503 | 604 | 84 | 46 | 44 | 42 |

STREAMFLOW during April was below normal in most areas of the state but above normal in northwestern and north-central Ohio drainage basins. Flows in some eastern Ohio drainage basins were low enough to be considered deficient. Flows in the southern and eastern areas of the state decreased seasonally during April while flows in western and north-central Ohio drainage basins were greater than the flows recorded during March.

Flows at the beginning of April were noticeably below normal throughout the state. Lowest flows for April were recorded randomly during the first eight days of the month throughout the state. Flows peaked during three periods following widespread regional precipitation. Minor flooding was reported in the northwestern and north-central areas of Ohio. Greatest flows in the northern area of the state were observed during April 10-12, in the eastern drainage basins during April 14-15, and in southern Ohio during April 22-23. Flows decreased during the last week of the month and had returned to noticeably below normal levels at the month's end.

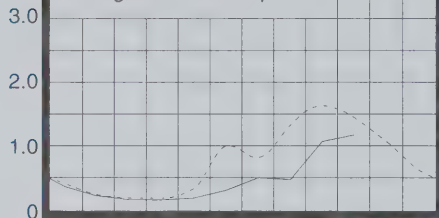
RESERVOIR STORAGE for water supply during April increased seasonally in both the Mahoning and Scioto river basin reservoirs. Storage remained above normal in the Scioto basin index reservoirs and slightly below normal in the Mahoning basin index reservoirs.

Reservoir storage at the end of April in the Mahoning basin index reservoirs was 97 percent of rated capacity for water supply compared with 85 percent for last month and 101 percent for April 1994. Month-end storage in the Scioto basin index reservoirs was 104 percent of rated capacity for water supply compared with 103 percent for last month and 103 percent for April 1994. Surface water supplies are at favorable levels for this time of the year.

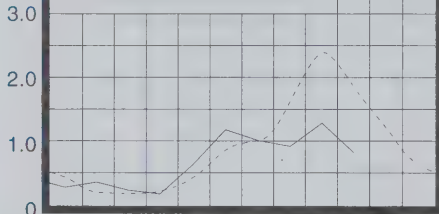
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)

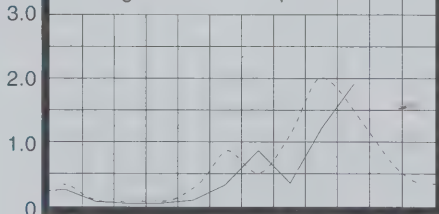
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



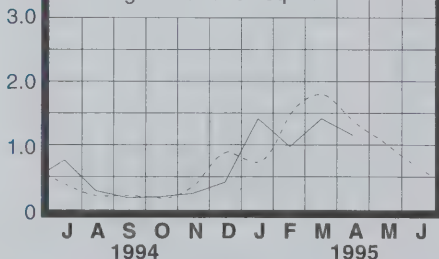
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.

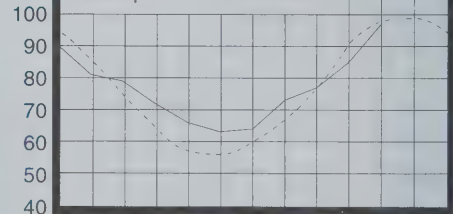


Base period for all streams: 1961-1990

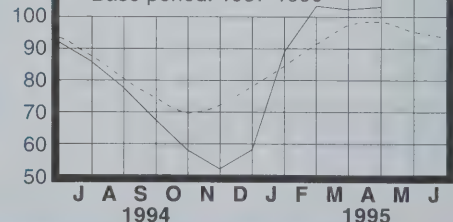
RESERVOIR STORAGE FOR WATER SUPPLY

Rated capacity (%) for water supply

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



Normal --- Current

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.75 | -3.32 | -0.53 | -3.06 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.33 | -0.59 | -0.24 | -0.17 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.79 | -0.39 | +0.45 | -1.29 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.77 | -2.34 | +0.21 | -1.45 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.19 | +0.28 | +0.24 | -0.11 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.43 | -1.91 | +0.37 | -0.77 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.78 | -3.98 | -0.18 | -3.17 |

GROUND WATER LEVELS during April showed mixed responses around the state, generally reflecting the respective regional month's precipitation. Ground water storage improved in most northern and western Ohio aquifers while declining in most aquifers in the eastern and southern areas of the state. Declines in ground water levels are an exception to the norm for April. In aquifers where levels rose, net changes from last month's levels were less than usually observed.

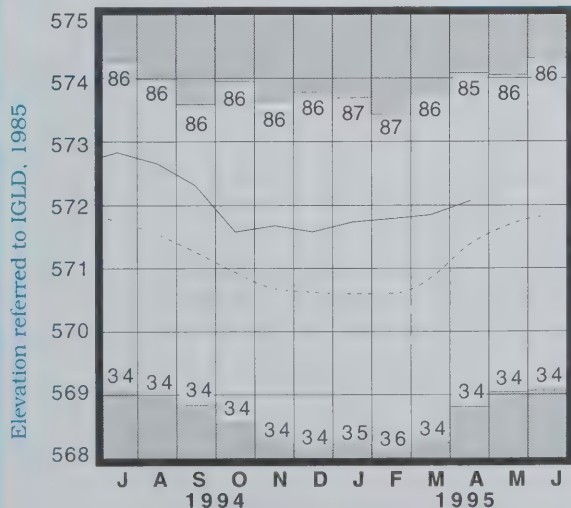
Ground water storage continues to remain at below normal levels throughout most of the state. The greatest departures continue to exist in the eastern half of the state, but some aquifers in southwestern Ohio are showing similar departures. Index observation well Tu-1 (Tuscarawas County), representing sand and gravel aquifers in eastern and northeastern Ohio, reached its lowest April level ever observed during its more than 47 years of record.

Current ground water levels also continue to remain lower than they were a year ago, ranging up to more than three feet lower than the April 1994 levels in some eastern Ohio aquifers. Adequate precipitation during the summer growing season will benefit agricultural crops and reduce demand on public and private water supplies, but does little to improve the overall ground water storage situation. Water supply managers with ground water sources should continue to closely monitor their situations and plan accordingly.

LAKE ERIE level rose seasonally during April. The mean level was 572.11 feet (IGLD-1985), 0.26 foot above last month's mean level and 0.72 foot above normal. This month's level is 0.36 foot lower than the April 1994 level and 2.91 feet above Low Water Datum.

The U.S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during April averaged 3.9 inches, 0.8 inch above normal. The entire Great Lakes basin averaged 2.9 inches of precipitation in April, 0.4 inch above normal. For calendar year 1995 through April, the Lake Erie basin has averaged 10.8 inches of precipitation, 0.4 inch above normal and the entire Great Lakes basin has averaged 8.7 inches, 0.1 inch above normal.

LAKE ERIE LEVELS at Fairport

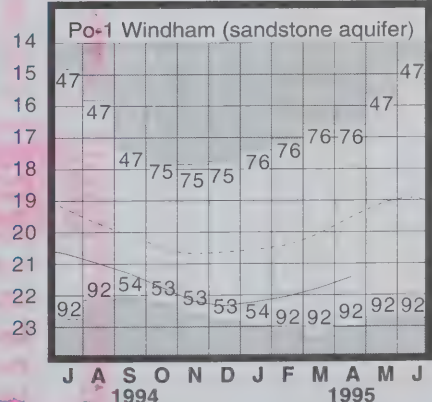
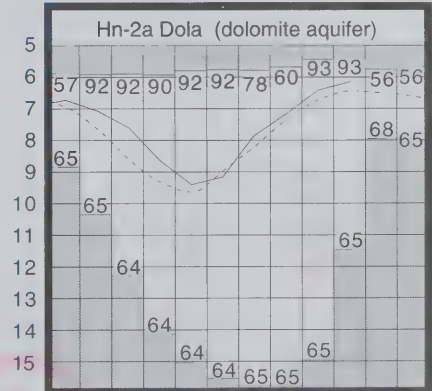
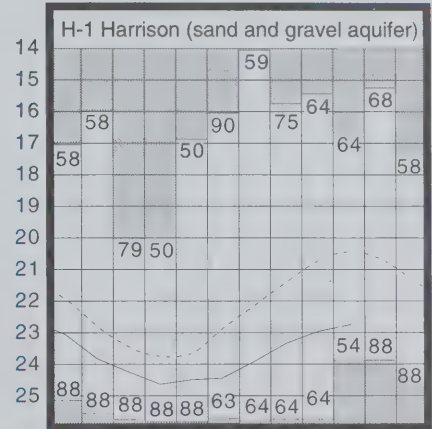


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation was above normal throughout most of Ohio but below normal in the eastern and south-central areas of the state. Streamflow was below normal in most drainage basins but above normal in the northwestern and north-central areas of the state. Reservoir storage improved and was at near normal seasonal levels. Ground water storage had mixed responses generally reflecting the month's precipitation within each region. Lake Erie level rose 0.26 foot and was 0.72 foot above the long-term April average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Champaign County
by Wayne Jones

Ground Water Pollution Potential of Clark County
by Joel D. Vormelker, Michael P. Angle and Wayne Jones

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring, and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

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| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
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May
1995

p2-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

May 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION for May was above normal throughout most of Ohio especially in the southern half of the state where it was excessive. The state average was 5.97 inches, 2.22 inches above normal. This ranks as the eighth wettest May for the state as a whole during the past 113 years. Regional averages ranged from 8.99 inches, 5.07 inches above normal, for the Southwest Region to 3.74 inches, 0.20 inch above normal, for the Northwest Region. This was the third wettest May on record for the Southwest Region, the fifth wettest for the West Central Region, the sixth wettest for the South Central Region and the seventh wettest for the Southeast Region. Stonelick State Park (Clermont County) reported the greatest amount of precipitation during May, 12.92 inches. Lima (Allen County) reported the least amount, 2.84 inches.

Precipitation fell during every week in May. The first week of May was somewhat drier than the remainder of the month in some areas, but there were still several days with measurable precipitation. The northern areas of the state generally reported less than 0.5 inch of rain during this period with amounts increasing to the south where extreme southern Ohio reported more than 1 inch. The first of a series of storms crossed Ohio during May 9-10 with most areas of the state receiving between 0.5 and 1 inch of rain. Strong storms in the southern half of Ohio during May 13-14 resulted in flash flooding of small streams and urban areas in areas where more than 3 inches of rain was reported. Hardest hit were Gallia, Meigs, Ross and Vinton counties with damage also reported in Preble, Lawrence and other counties. More storms during May 17-18 caused secondary stream and main stem flooding in the southern half of Ohio after 1 to 3 inches of rain fell throughout most of the state. The last ten days of the month continued to be very wet with storms widespread during May 24-25 and 28-29. Most areas of Ohio received between 1 and 2 inches of rain during these storms, but some areas, especially in the southwestern area of Ohio, received greater amounts which resulted in some localized flooding.

The above normal precipitation during May was beneficial for water supplies, but has caused a delay in planting of agricultural crops. At the end of May, the Ohio Agricultural Statistics Service reports that soils in two-thirds of the state have a surplus of moisture. The above normal precipitation erased the mild drought conditions in most areas of Ohio that were present at the end of April, but the Palmer Drought Severity Index indicates that portions of northern and western Ohio still have a slight long-term moisture deficit.

(continued on back)

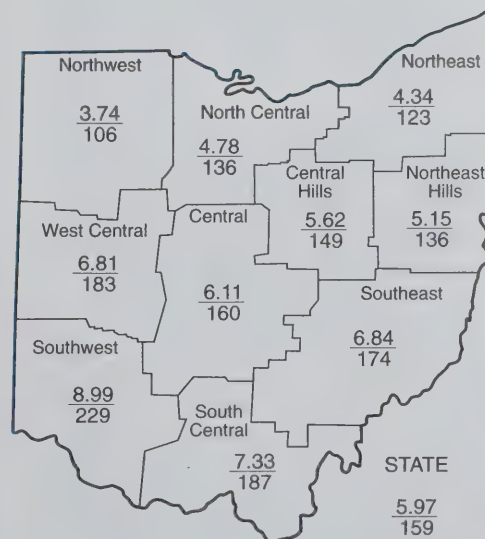
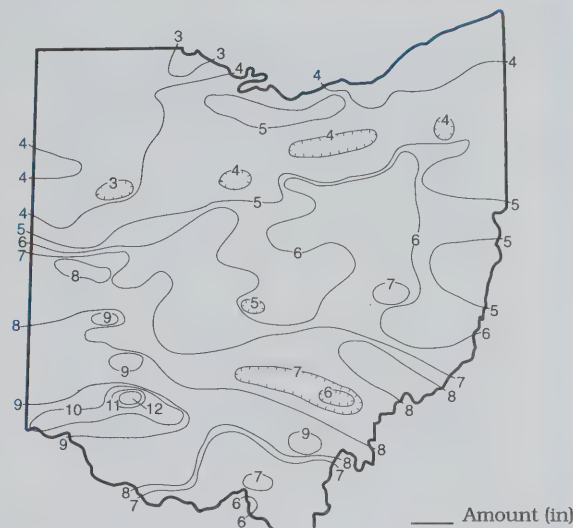
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.20 | +0.15 | -0.03 | -3.08 | -5.19 | -1.0 |
| North Central | +1.27 | +1.70 | +3.20 | +2.16 | -0.25 | +0.7 |
| Northeast | +0.81 | -0.67 | +0.47 | +0.87 | +5.67 | -0.8 |
| West Central | +3.09 | +2.54 | +0.72 | -2.21 | +1.62 | -0.6 |
| Central | +2.30 | +0.48 | +0.98 | -0.83 | +0.99 | +0.7 |
| Central Hills | +1.85 | +0.41 | +2.07 | +1.45 | +2.38 | +0.3 |
| Northeast Hills | +1.37 | -1.14 | -1.22 | -1.26 | +3.11 | +0.2 |
| Southwest | +5.07 | +3.60 | +1.85 | -0.99 | -0.79 | +1.2 |
| South Central | +3.40 | -0.28 | +0.25 | -2.18 | +0.14 | +0.2 |
| Southeast | +2.90 | +0.06 | +0.79 | +0.14 | +3.23 | +1.1 |
| State | +2.22 | +0.68 | +0.91 | -0.59 | +1.12 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION MAY 1995



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | This Month Mean Discharge (CFS) | % of Normal | % of Normal Past .. | | |
|---|-------------------------|------------------------------------|-------------|---------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 552 | 89 | 78 | 82 | 74 |
| Great Miami River at Hamilton | 3,630 | 9,384 | 239 | 94 | 73 | 73 |
| Huron River at Milan | 371 | 346 | 129 | 90 | 84 | 82 |
| Killbuck Creek at Killbuck | 464 | 649 | 131 | 76 | 80 | 72 |
| Little Beaver Creek near East Liverpool | 496 | 671 | 116 | 60 | 75 | 68 |
| Maumee River at Waterville | 6,330 | 4,307 | 85 | 89 | 74 | 62 |
| Muskingum River at McConnelsville | 7,422 | 12,595 | 129 | 75 | 84 | 80 |
| Scioto River near Prospect | 567 | 1,024 | 243 | 136 | 97 | 97 |
| Scioto River at Higby | 5,131 | 12,526 | 237 | 103 | 94 | 90 |
| Stillwater River at Pleasant Hill | 503 | 1,416 | 367 | 108 | 73 | 66 |

STREAMFLOW during May was above normal throughout most of the state, with only northwestern and northeastern Ohio drainage basins having below normal flows. Flows in the southern half of the state were high enough to be considered excessive. Flows in the northern one-third of the state declined seasonally from the April flows, but in the southern two-thirds of the state, flows increased noticeably.

Flows at the beginning of May were below normal throughout the state. Most areas recorded the month's lowest flows on or about May 8, just prior to the arrival of the first of a series of storms to cross the state. Heavy storms resulted in flash flooding especially in Ross, Gallia and Meigs counties following storms during May 13-14. Flooding was also

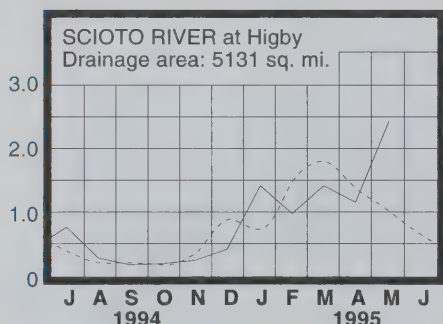
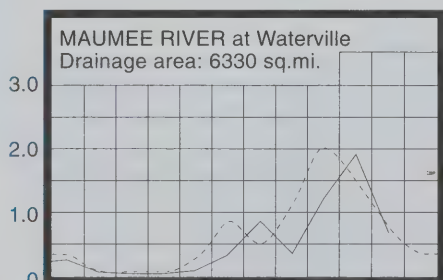
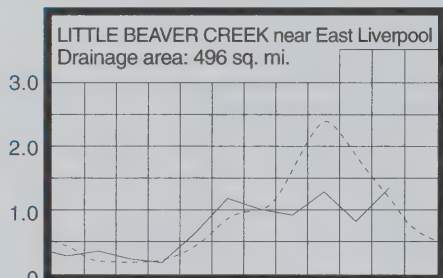
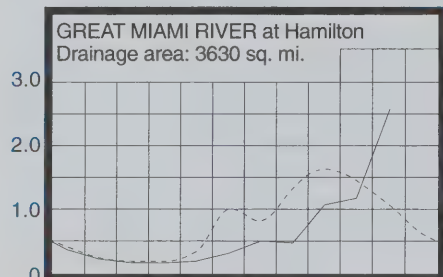
reported in the southern half of the state following thunderstorms on May 17-18. Greatest flows for the month occurred during May 19-21 following these storms. At the end of May, flows were noticeably above normal throughout the state.

RESERVOIR STORAGE for water supply during May increased in both the Mahoning and Scioto river basins. Storage was above normal in both basins.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 105 percent of rated capacity for water supply compared with 97 percent for last month and 98 percent for May 1994. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with 104 percent for last month and 98 percent for May 1994. Surface water supplies are in very good shape throughout Ohio.

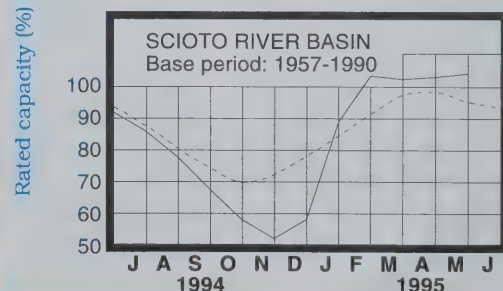
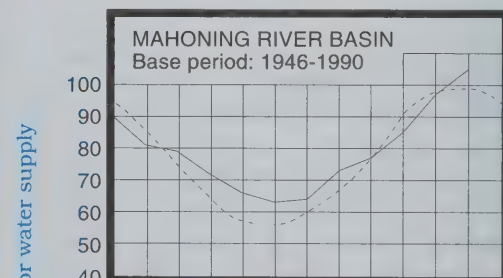
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal Current

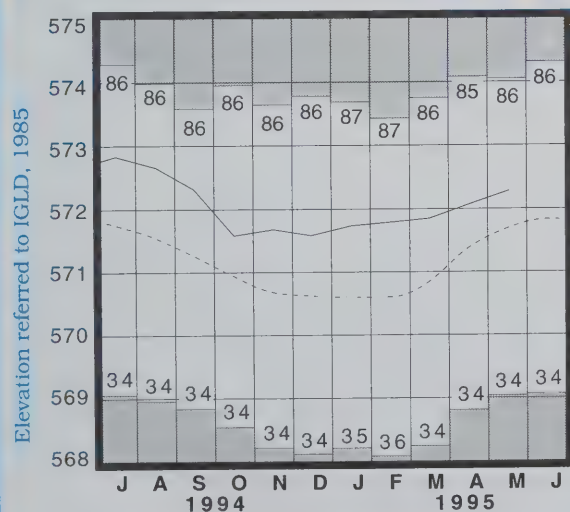
GROUND WATER LEVELS during May rose in most aquifers throughout Ohio. A few exceptions were noted in the northwestern area of the state where ground water levels were stable or declined slightly, reflecting the near normal regional precipitation. Net changes from last month's levels were unseasonably positive in most shallow aquifers, especially in unconsolidated aquifers in the southern half of the state. Net changes in most consolidated aquifers in the northern half of the state were less than normally observed. Generally, ground water levels were stable or declining slowly during the first ten days of the month and then began rising following widespread precipitation.

Following the noticeably above normal precipitation in many areas of Ohio during May, ground water storage has improved to near normal levels in the western half of the state; however, storage continues to remain at noticeably below normal levels in the eastern half of Ohio, ranging up to more than three feet below normal. As a case in point, index observation well Tu-1 (Tuscarawas County), representing sand and gravel aquifers in eastern and northeastern Ohio, reached the lowest May level ever observed during its more than 47 years of record before rising during the second half of the month.

As a result of the above normal precipitation during May, current ground water levels are higher than they were a year ago in many aquifers in the western half of the state. May's abundant precipitation helped close the gap between this year's and last year's levels in the eastern half of the state, but current levels still remain lower than they were a year ago. Some delayed recharge can be expected, especially in consolidated aquifers, and since soil moisture is surplus in many areas of Ohio, near normal precipitation during June might provide some recharge to shallow aquifers. Water supply managers with ground water sources should still continue to monitor their situations throughout the summer months.

LAKE ERIE level rose seasonally during May. The mean level was 572.31 feet (IGLD-1985), 0.20 foot above last month's mean level and 0.62 foot above normal. This month's level is 0.36 foot lower than the May 1994 level and 3.11 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current - - - -

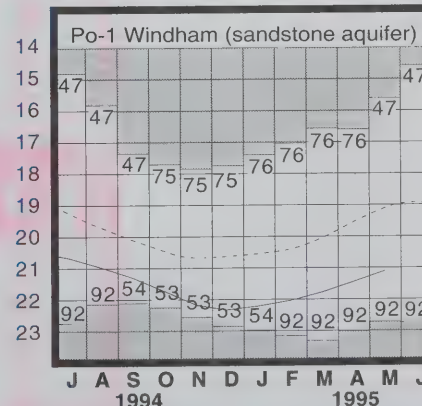
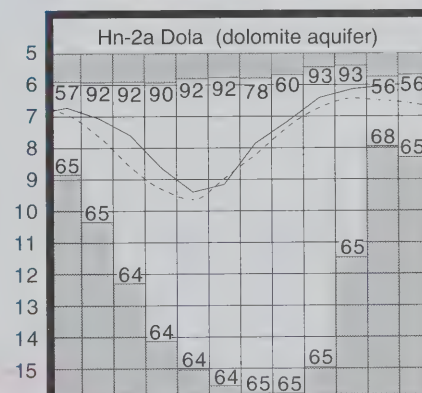
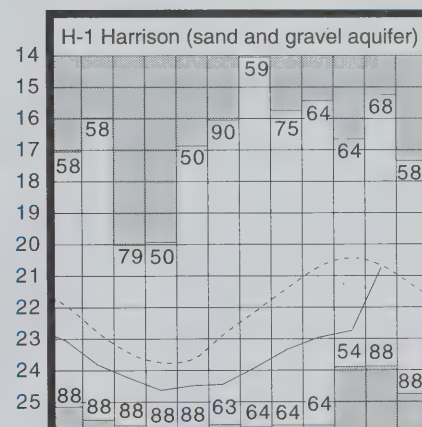
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.56 | -1.84 | +1.19 | -0.01 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.06 | -0.04 | +0.27 | +0.25 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.43 | +0.20 | +0.36 | -1.07 |
| H-1 | Harrison, Hamilton Co. | Gravel | 20.76 | -0.08 | +2.01 | +0.79 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.09 | +0.44 | +0.10 | +0.38 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.11 | -2.02 | +0.32 | -0.81 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.61 | -3.48 | +0.17 | -2.38 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

Precipitation for the 1995 calendar year is now above normal throughout most of Ohio but remains slightly below normal in the Northwest and Northeast Hills regions. The state average is 16.54 inches, 0.90 inch above normal. Regional averages range from 19.65 inches, 2.15 inches above normal, for the Southwest Region to 13.47 inches, 0.27 inch below normal, for the Northwest Region.

Precipitation for the 1995 water year remains slightly below normal throughout much of Ohio but is above normal in the North Central, Central Hills and Southwest regions. The state average is 23.11 inches, 0.10 inch below normal. Regional averages range from 26.54 inches, 0.85 inch above normal, for the Southwest Region to 20.20 inches, 0.57 inch below normal, for the Northwest Region.

SUMMARY

Precipitation was above normal throughout the state. The state average was 5.97 inches which ranks this May as the eighth wettest on record. Streamflow was above normal in all but the northwestern and northeastern areas of the state. Flooding occurred in several southern and southeastern counties. Reservoir storage increased and was at above normal seasonal levels. Ground water storage improved but remained at below normal levels in the eastern half of the state. Lake Erie level rose 0.20 foot and was 0.62 foot above the long-term May average.

NOTES AND COMMENTS

ASSISTANT CHIEF NAMED FOR THE DIVISION OF WATER

Division of Water Chief Michele Willis recently announced the appointment of Richard S. Bartz as assistant chief of the Division of Water. Mr. Bartz started working for ODNR in 1974 with the Division of Planning developing an Ohio coastal management program. In 1975, he temporarily left Ohio and worked for Indiana DNR on a natural resource inventory for the Lake Michigan shoreline area. He returned to Ohio in 1976 where he joined the Division of Water working on Ohio's coastal management efforts.

Mr. Bartz has represented Ohio on the International Joint Commission's study for the Lake Levels Reference, the Water Resources Management Committee to the Council of Great Lakes Governors and the Water Data Task Force to the Great Lakes Commission. He was instrumental in the passage of Ohio's coastal management legislation, Sub. S.B. 70 and H.B. 662, the Great Lakes Charter.

Richard has served as administrator of the Division of Water's Water Resources Development Section (now the Water Planning and Management Section) where he was responsible for the division's efforts in water supply planning, community water assistance, floodplain management, water withdrawal facility registration and coastal management. Most recently, Mr. Bartz was on a temporary reassignment for ten months as Executive Assistant to the Water Resources Planning and Development Implementation Committee.

Chief Willis praised Mr. Bartz's contributions to water resources policy and planning during the past 21 years. His new responsibilities as assistant chief will include long range planning, legislation, training coordination, public information and QStP Guidance Committee member.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.
Lake Erie level data: U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

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Director

Michele Willis
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MONTHLY WATER INVENTORY REPORT FOR OHIO

June 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

June
1995

PRECIPITATION for June was above normal throughout most of Ohio but below normal at scattered locations in the southwestern, north-central and northeastern areas of the state. The state average was 4.20 inches, 0.24 inch above normal. Regional averages ranged from 6.24 inches, 2.18 inches above normal, for the Central Region to 3.08 inches, 0.74 inch below normal, for the North Central Region. Columbus Parsons Avenue Water Plant (Franklin County) reported the greatest amount of precipitation for the month, 9.12 inches. Elyria (Lorain County) reported the least amount, 1.52 inches.

Precipitation during June fell as showers and scattered thunderstorms with some storms producing severe weather and large amounts of precipitation. Rain fell during every week of June, but in many locations the middle of the month was the driest. Most areas of the state received about 0.75 inch of rain during the first week of the month. Locally severe storms on June 7 caused much damage in Knox County. Through June 12, storms continued to be widespread, but common statewide with many areas in central and southeastern Ohio reporting more than 1 inch during the second week of the month. Showers became very widely scattered during the third week of June with most areas reporting less than 0.5 inch of rain and some areas almost nothing. The last ten days of the month were very summer-like with convective thunderstorms common throughout the period. Most areas of the state reported more than 1 inch of precipitation during this period with many locations reporting much more. Some locations in central Ohio reported more than three inches of rain during June 26-27.

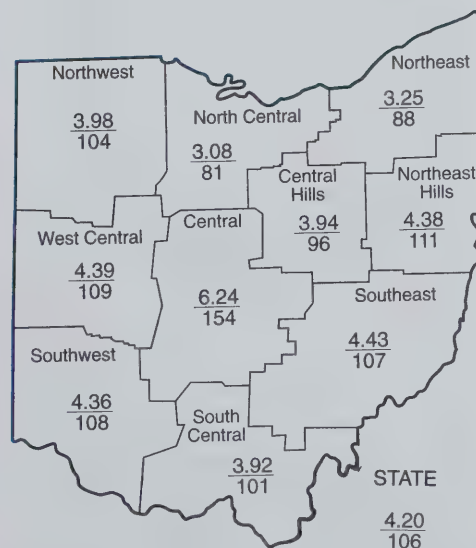
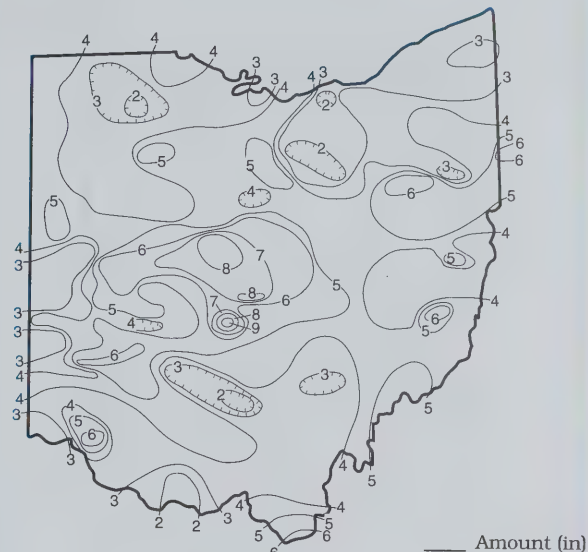
Precipitation for the first half of the 1995 calendar year is above normal throughout most of Ohio but slightly below normal in the Northwest, North Central and Northeast Hills regions. The state average is 20.74 inches, 1.14 inches above normal. Regional averages range from 24.01 inches, 2.46 inches above normal, for the Southwest Region to 17.45 inches, 0.12 inch below normal, for the Northwest Region (see Precipitation table, departure from normal, past six months column). Most areas of Ohio have averaged above normal precipitation during the past three months. This reversed the trend of the first three months of the calendar year during which time precipitation had been noticeably below normal.

Precipitation for the 1995 water year is near normal throughout the state ranging from slightly above normal in central, north-central, southwestern and southeastern Ohio to slightly below normal in the northwestern, northeastern and south-central areas of the state. The state average is 27.31 inches, 0.14 inch above normal. Regional averages range from 30.90 inches, 1.16 inches above normal, for the Southwest Region to 24.18 inches, 0.42 inch below normal, for the Northwest Region.

PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.15 | +1.49 | -0.12 | -2.88 | -6.13 | -0.9 |
| North Central | -0.74 | +2.05 | +2.08 | +0.34 | -1.46 | -0.5 |
| Northeast | -0.43 | +0.27 | -0.06 | +0.15 | +2.99 | -1.2 |
| West Central | +0.35 | +4.12 | +1.40 | -2.43 | +0.74 | -0.2 |
| Central | +2.18 | +4.52 | +3.29 | +1.19 | +2.43 | +0.7 |
| Central Hills | -0.17 | +1.96 | +1.76 | +0.32 | +1.13 | -0.8 |
| Northeast Hills | +0.42 | +1.10 | -0.78 | -0.99 | +3.14 | -1.2 |
| Southwest | +0.31 | +5.63 | +2.46 | -0.54 | -0.86 | -0.4 |
| South Central | +0.04 | +1.97 | +0.25 | -1.54 | +0.36 | -0.2 |
| Southeast | +0.29 | +2.24 | +1.07 | +1.04 | +4.09 | -0.6 |
| State | +0.24 | +2.53 | +1.14 | -0.53 | +0.67 | |

PRECIPITATION JUNE 1995



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

MEAN STREAM DISCHARGE

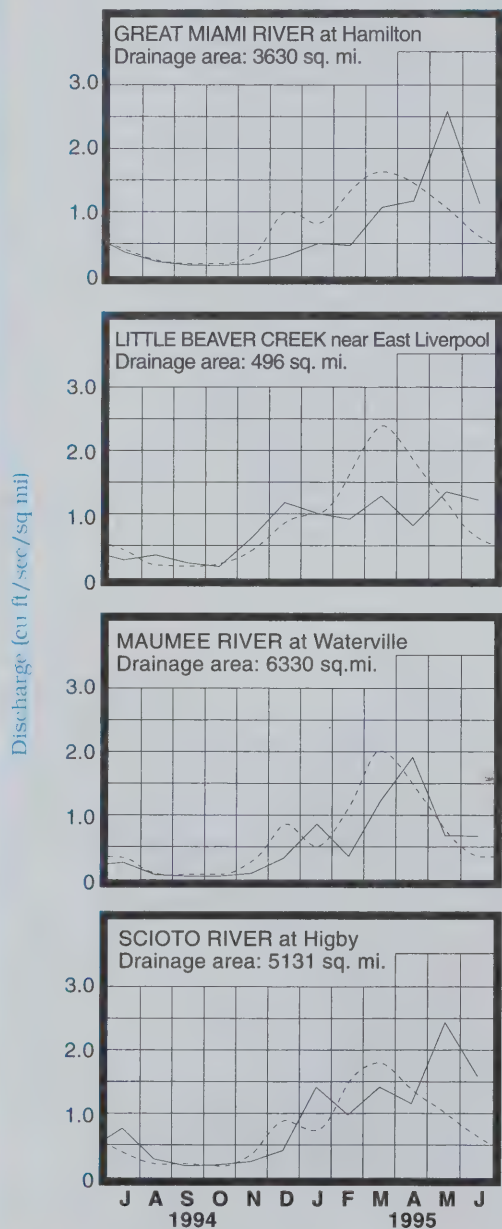
| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 213 | 82 | 78 | 79 | 74 |
| Great Miami River at Hamilton | 3,630 | 4,115 | 177 | 128 | 86 | 77 |
| Huron River at Milan | 371 | 401 | 232 | 142 | 98 | 85 |
| Killbuck Creek at Killbuck | 464 | 469 | 178 | 90 | 85 | 78 |
| Little Beaver Creek near East Liverpool | 496 | 608 | 194 | 83 | 76 | 75 |
| Maumee River at Waterville | 6,330 | 4,237 | 186 | 100 | 81 | 66 |
| Muskingum River at McConnelsville | 7,422 | 8,487 | 143 | 87 | 90 | 86 |
| Scioto River near Prospect | 567 | 903 | 339 | 179 | 111 | 107 |
| Scioto River at Higby | 5,131 | 8,178 | 234 | 134 | 103 | 102 |
| Stillwater River at Pleasant Hill | 503 | 319 | 119 | 137 | 82 | 70 |

STREAMFLOW during June was above normal throughout most of Ohio with only the extreme northeast corner of the state having below normal flows. Flows from southwestern Ohio up through the central and north-central areas of the state were high enough to be considered excessive. Flows during June declined seasonally from the flows recorded during May in most drainage basins.

Flows at the beginning of June were noticeably above normal throughout the state. Greatest flows for the month occurred at various times following the heaviest local precipitation; most larger streams and rivers had their greatest flows at or near the month's end. Moderate small stream and urban flooding was reported following some local storms,

but only low level flooding occurred along the major rivers, especially in the central and southwestern area of the state. Lowest flows for the month occurred during June 20-24 in nearly all drainage basins. At the end of June, flows remained at above-normal levels in all but the extreme northeastern area of the state.

MEAN STREAM DISCHARGE

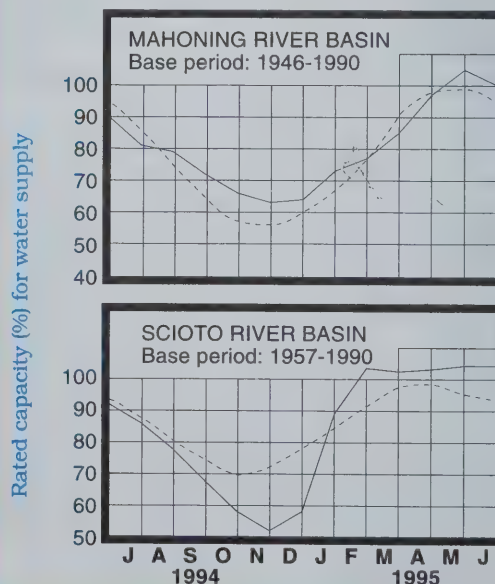


Base period for all streams: 1961-1990

RESERVOIR STORAGE for water supply during June declined slightly in the Mahoning basin index reservoirs and was unchanged in the Scioto basin index reservoirs. Storage remained at above normal seasonal levels in both basins.

Reservoir storage at the end of June in the Mahoning basin index reservoirs was 100 percent of rated capacity for water supply compared with 105 percent for last month and 90 percent for June 1994. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with the same for last month and 92 percent for June 1994. Surface water supplies remain adequate throughout Ohio.

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

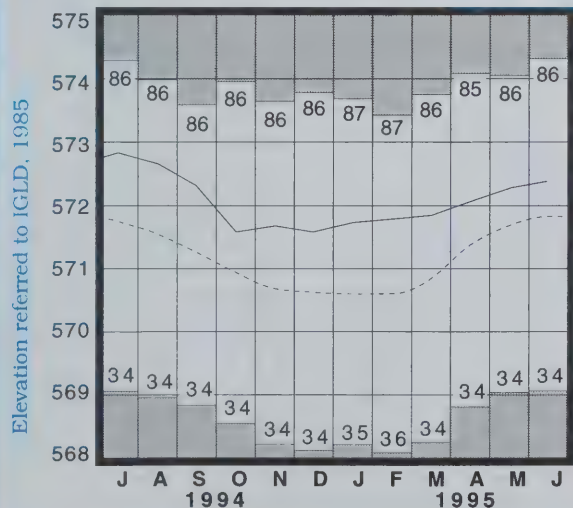
GROUND WATER LEVELS during June showed a net improvement from last month's levels in most of Ohio's aquifers. Ground water levels during the month responded differently across Ohio due to variations in precipitation and aquifer types. Generally, ground water levels were stable during the first half of the month and during the second half, declined in deeper aquifers while rising in many shallower aquifers.

The above normal precipitation during the past two months has been beneficial for ground water supplies. Ground water levels in the western two-thirds of the state are higher than those of last year and moderately above normal for this time of the year. However, in the eastern one-third, current levels are lower than the June 1994 levels and continue to be below normal. Little if any recharge can be expected during the next several months, but the abundant precipitation during May and June has greatly lessened the threat for potential ground water supply problems. A return to unusually dry conditions during the next several months could reverse this recent trend and therefore, water supply managers with ground water sources should continue to monitor their situations.

LAKE ERIE level rose seasonally during June. The mean level was 572.41 feet (IGLD-1985), 0.10 foot above last month's mean level and 0.59 foot above normal. This month's level is 0.26 foot lower than the June 1994 level and 3.21 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during June averaged 3.2 inches, 0.2 inch below normal. The entire Great Lakes basin averaged 1.9 inches of precipitation in June, 1.3 inches below normal. For calendar year 1995 through June, the Lake Erie basin has averaged 17.5 inches of precipitation, 0.4 inch above normal and the entire Great Lakes basin has averaged 13.7 inches, 1.1 inches below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

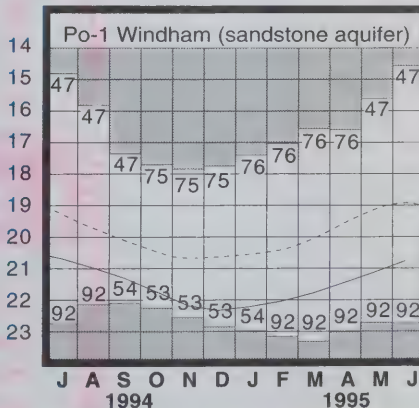
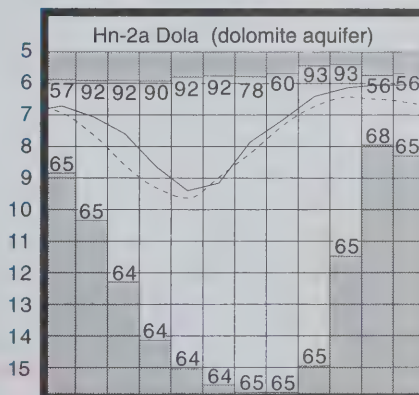
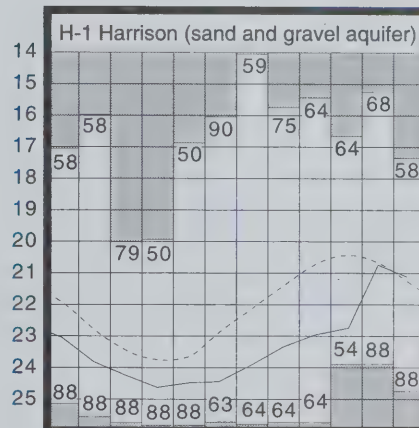
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 13.41 | +0.50 | +1.15 | +3.34 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.05 | +0.32 | +0.01 | +0.89 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.16 | +0.89 | +0.27 | +0.42 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.12 | +0.18 | -0.36 | +1.54 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.09 | +0.54 | 0.00 | +0.83 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.78 | -1.86 | +0.33 | -0.31 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.93 | -2.04 | +0.68 | -0.26 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was above normal in most areas of the state but below normal at scattered locations especially in northeastern Ohio. Streamflow was above normal throughout most of Ohio. Reservoir storage was stable or declined slightly but remained at above normal levels. Ground water storage improved from last month and is slightly above normal in the western half of the state but remains below normal in the eastern half. Lake Erie level rose and was 0.59 foot above the long-term June average.

NOTES AND COMMENTS

NEW PUBLICATION

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Greene County
by Wayne Jones

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

June
1995
ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

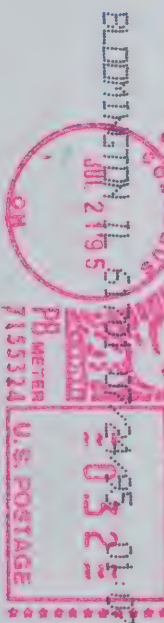
Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Consergency District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor
Donald C. Anderson
Director
Michele Willis
Chief

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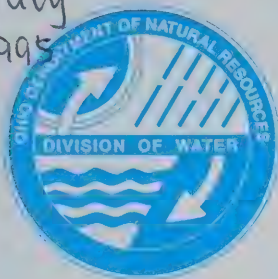
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July
1995

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MONTHLY WATER INVENTORY REPORT FOR OHIO

July 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

AG 28 95

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PRECIPITATION during July was below normal in northwestern, eastern and southern Ohio and above normal in the central, western and northeastern areas of the state. The state average was 3.36 inches, 0.56 inch below normal. Regional averages ranged from 4.79 inches, 1.08 inches above normal, for the West Central Region to 1.65 inches, 1.79 inches below normal, for the Northwest Region. Urbana (Champaign County) reported the greatest amount of precipitation during July, 9.77 inches. Toledo Express Airport (Lucas County) reported the least amount, only 0.34 inch.

Precipitation during July fell in the typical summer fashion as scattered showers and thunderstorms. Several storms during the month were locally severe with heavy downpours. Some local urban and small stream flooding was reported. Generally, the first half of the month was much drier than the second half in most areas of the state. Noticeably above normal temperatures also occurred during this period. At the end of the month, the Ohio Agricultural Statistics Service reports that soil moisture was rated as being adequate in 60 percent of the state, short in 19 percent and surplus in 21 percent.

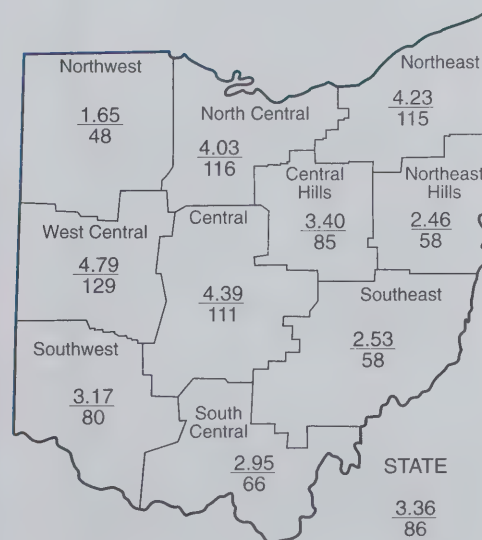
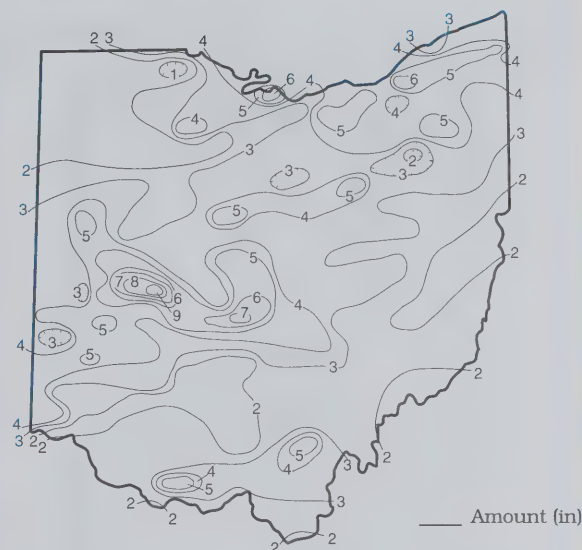
Precipitation during the first week of July averaged about 0.5 inch in most areas of the state, but amounts of up to 2 inches fell in extreme southwestern Ohio. Storms continued to be widely scattered during the second week of the month with some areas in northeastern Ohio recording more than 2 inches of rain. Many areas in western and southwestern Ohio recorded more than 1 inch of rain during this period while the remainder of the state received much less. Storms became more widespread during the third week of July with much of Ohio receiving from 1 to more than 2 inches of rain. The greatest amounts fell in the central and north-central areas of the state while northwestern and southern Ohio received noticeably less. The last ten days of the month were the wettest for many locations. Rain fell during several days at many areas, but northwestern Ohio continued to be rather dry. The greatest amounts, more than 2 inches, again fell in the western and central areas of the state.

Precipitation for the 1995 calendar year is above normal in most areas of Ohio but below normal in the Northwest, Northeast Hills, South Central and Southeast regions. The state average is 24.14 inches, 0.62 inch above normal. Regional averages range from 27.60 inches, 3.72 inches above normal, for the Central Region to 19.10 inches, 1.91 inches below normal, for the Northwest Region.

Precipitation for the 1995 water year is below normal in the southern, eastern and northwestern areas of the state and above normal in the central, north-central and western areas. The state average is 30.70 inches, 0.39 inch below normal. Regional averages range from 34.07 inches, 0.36 inch above normal, for the Southwest Region to 25.83 inches, 2.21 inches below normal, for the Northwest Region.

PRECIPITATION

PRECIPITATION JULY 1995



Average (in)
Percent of normal

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.79 | -1.44 | -2.55 | -4.01 | -7.53 | -2.7 |
| North Central | +0.57 | +1.10 | +0.54 | +1.90 | +0.55 | -1.2 |
| Northeast | +0.55 | +0.93 | -1.04 | +1.13 | +4.70 | -1.6 |
| West Central | +1.08 | +4.52 | +2.83 | -0.67 | -1.48 | -0.3 |
| Central | +0.43 | +4.91 | +2.24 | +1.85 | +0.84 | +0.4 |
| Central Hills | -0.59 | +1.09 | -1.17 | +0.28 | +0.91 | -1.4 |
| Northeast Hills | -1.75 | +0.22 | -2.93 | -1.88 | +1.42 | -1.6 |
| Southwest | -0.80 | +4.58 | +1.88 | -1.23 | -0.79 | -0.7 |
| South Central | -1.51 | +1.93 | -2.68 | -3.25 | +0.06 | -1.6 |
| Southeast | -1.84 | +1.55 | -1.77 | -1.61 | +2.88 | -1.8 |
| State | -0.56 | +1.94 | -0.46 | -0.74 | +0.18 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 160 | 56 | 62 | 64 | 73 |
| Great Miami River at Hamilton | 3,630 | 3,219 | 220 | 202 | 98 | 82 |
| Huron River at Milan | 371 | 130 | 178 | 149 | 96 | 87 |
| Killbuck Creek at Killbuck | 464 | 191 | 105 | 118 | 70 | 79 |
| Little Beaver Creek near East Liverpool | 496 | 370 | 175 | 119 | 73 | 78 |
| Maumee River at Waterville | 6,330 | 2,592 | 115 | 105 | 78 | 68 |
| Muskingum River at McConnellsville | 7,422 | 4,242 | 98 | 122 | 81 | 87 |
| Scioto River near Prospect | 567 | 388 | 380 | 232 | 111 | 106 |
| Scioto River at Higby | 5,131 | 5,344 | 268 | 236 | 106 | 104 |
| Stillwater River at Pleasant Hill | 503 | 225 | 163 | 218 | 95 | 71 |

STREAMFLOW during July was above normal throughout most of the state with only extreme northeastern Ohio and some basins in southeastern Ohio having below normal flows. Flows in the central and south-central Ohio drainage basins were high enough to be considered excessive. Flows during July declined seasonally from the flows recorded during June in all areas of the state.

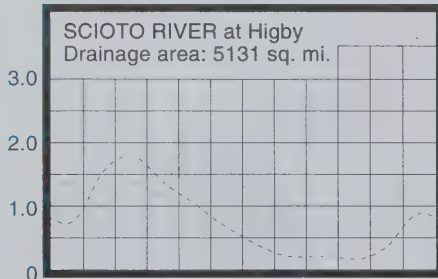
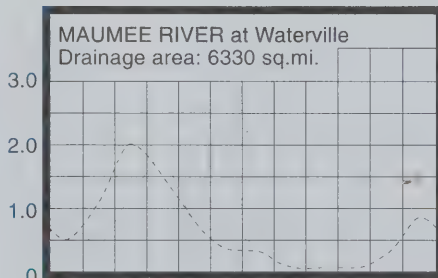
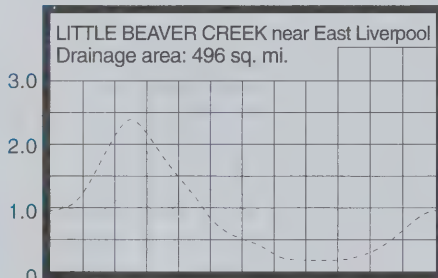
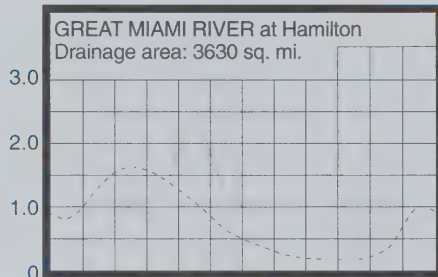
Flows at the beginning of the month were above normal throughout the state still responding to widespread precipitation during the last ten days of June. Many basins recorded their greatest flows for July on the first day of the month. Generally, flows declined steadily through the middle of the month. Many drainage basins recorded their lowest flows for July at this time before rising slightly in response to precipitation. Some basins, where precipitation was light just after mid-month, recorded their lowest flows about a week later. Some areas of north-central and northeastern Ohio recorded their lowest flows at the end of the month. Significant increases in streamflows in most areas of Ohio were noted during July 26-28 during which time some basins recorded their month's greatest flows. At the end of the month, flows were below normal in most areas of Ohio but still above normal in the central and southwestern areas of the state.

RESERVOIR STORAGE during July declined in both the Mahoning and Scioto river basin index reservoirs. Storage remained at above normal seasonal levels in both basins.

Reservoir storage at the end of July in the Mahoning basin index reservoirs was 94 percent of rated capacity for water supply compared with 100 percent for last month and 81 percent for July 1994. Month-end storage in the Scioto basin index reservoirs was 102 percent of rated capacity for water supply compared with 105 percent for last month and 86 percent for July 1994. Water-supply storage in both on- and off-stream reservoirs remains at favorable levels for this time of the year throughout the state.

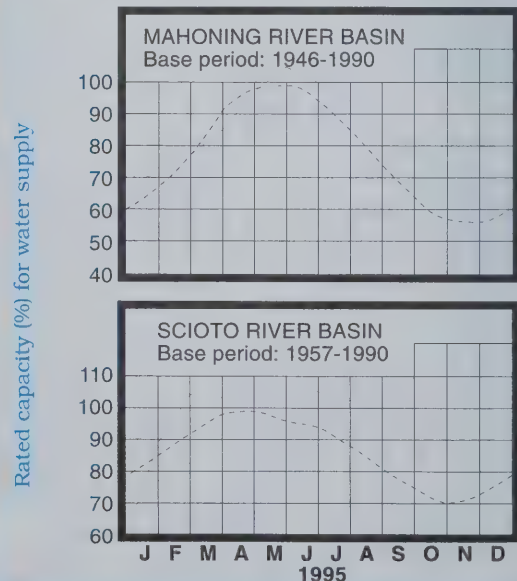
MEAN STREAM DISCHARGE

Discharge (cu ft./sec./sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal — Current

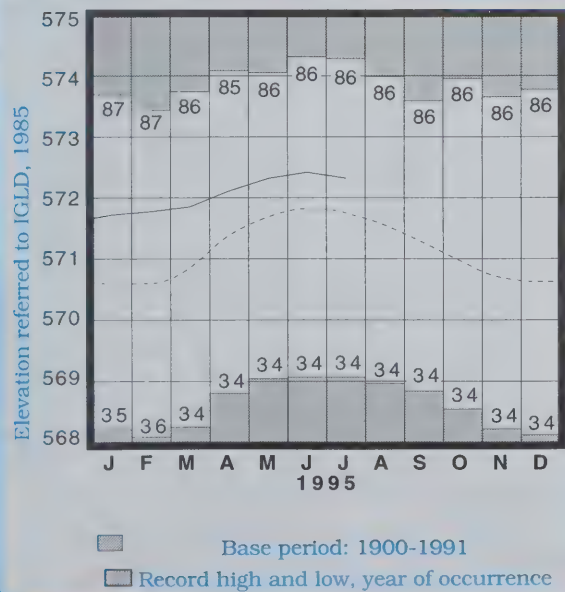
GROUND-WATER LEVELS during July declined in most aquifers throughout Ohio. A few exceptions were noted in consolidated aquifers where levels were steady or rose slightly during the month. Many shallow unconsolidated aquifers showed significant rises just before the end of the month, responding to locally abundant precipitation.

Ground water levels throughout most of Ohio are now higher than they were a year ago. This is a result of the exceptionally dry conditions of May and June last year and the above normal precipitation during the past three months in most areas of the state. The above normal precipitation during the past few months has been beneficial for ground water supplies; however, ground water levels remain below normal in many eastern and southern areas of the state where the 1995 water year precipitation is still below normal. The above normal precipitation in many areas has helped to reduce the demand on both private and public water supplies. Although they are at below normal levels, ground water supplies are adequate. The potential for possible supply problems in the late summer and fall months has been greatly reduced.

LAKE ERIE level declined during July. The mean level was 572.31 feet (IGLD-1985), 0.10 foot below last month's mean level and 0.56 foot above normal. This month's level is 0.52 foot lower than the July 1994 level and 3.11 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during July averaged 2.5 inches, 0.8 inch below normal. The entire Great Lakes basin averaged 3.2 inches of precipitation during July, 0.1 inch above normal. For calendar year 1995 through July, the Lake Erie basin has averaged 19.8 inches of precipitation, 0.6 inch below normal and the entire Great Lakes basin has averaged 16.7 inches, 1.2 inches below normal.

LAKE ERIE LEVELS at Fairport

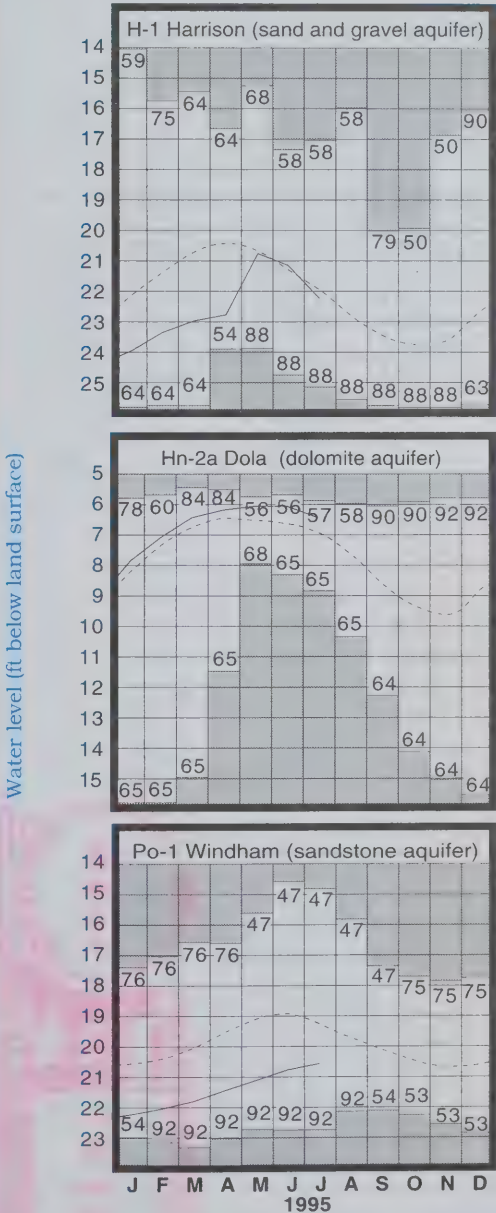


GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.61 | -0.49 | -2.20 | +2.23 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.63 | +0.17 | -0.58 | +0.54 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.47 | +0.99 | -0.31 | +0.49 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.23 | -0.27 | -1.11 | +0.81 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.44 | +0.51 | -0.35 | +0.29 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.58 | -1.29 | +0.20 | +0.11 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.44 | -1.92 | -0.51 | -0.06 |

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.
Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation was below normal in northwestern, southern and eastern Ohio and above normal in the western, central and northeastern areas of the state. Streamflow was above normal in most drainage basins. Reservoir storage declined but remained at above normal seasonal levels. Ground water levels declined and were below normal in the southern and eastern areas of the state, but higher than those levels observed in July 1994 statewide. Lake Erie level declined and was 0.56 foot above the long-term July average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Logan County
by Katherine M. Sprowls

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



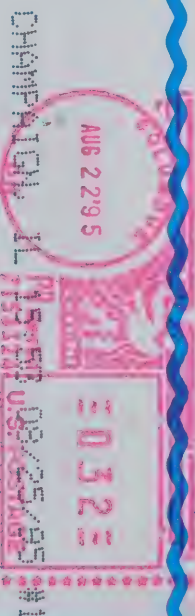
DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

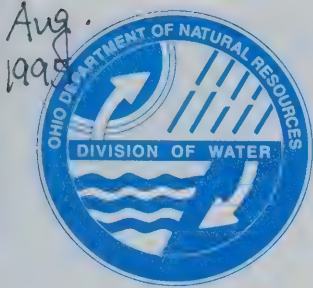
George V. Volinovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

21-186
August 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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0C 0 4 '95

PRECIPITATION during August was generally above normal in the central, west-central and extreme southern areas of the state and below normal in the eastern and northern areas. The state average was 4.36 inches, 0.88 inch above normal. Regional averages ranged from 5.89 inches, 2.59 inches above normal, for the West Central Region to 2.23 inches, 1.17 inches below normal, for the Northeast Region. Piqua (Miami County) reported the greatest amount of precipitation for the month, 13.84 inches. Unofficial reports of nearly 15 inches were received from the Miami, Shelby and Champaign County area. Warren (Trumbull County) reported the least amount of precipitation for August, only 0.94 inch.

Precipitation during August varied widely across Ohio with most of the precipitation falling during the first twenty days of the month. Temperatures were above normal throughout most of August as they were during much of July. The month started with a few widely scattered storms across the state. Moisture directed by a frontal system associated with Tropical Storm Dean began moving into Ohio on August 4, closely followed by the remnants of Hurricane Erin on August 5. Soaking rains covered much of the southern half and north-central areas of the state with totals greater than 4 inches reported throughout most of this area. The frontal system was slow moving and, therefore, moisture continued to be funnelled into the state. Locally severe storms developed during August 7-10 with areas in western and central Ohio hardest hit, but locally severe storms also occurred in other areas of the state. Nearly 11 inches of rain fell during August 7-8 in sections of Miami, Shelby, Logan and Champaign counties. Prospect (Marion County) also reported excessive precipitation (more than 6 inches) as did Fort Recovery (Mercer County). Severe small stream and urban flooding with significant damage was reported (see Notes and Comments on the last page of this report). Storms developed again during August 8-9 with up to 5 inches reported in sections of Erie, Lorain and Licking counties. Storms continued to develop on August 9-10 with a locally severe storm in Scioto County causing flooding that claimed three lives. Other areas also reported locally severe storms throughout August 7-10 with rain amounts of 2-4 inches common.

Scattered storms crossed Ohio during August 15 with more widespread precipitation falling during August 17-19. The remainder of the month was nearly dry with only a few light, widely scattered showers reported. Even with soils saturated at mid-month in many areas of the state, after ten or more days without rain coupled with high temperatures, soils were rather dry at the end of the month. The Ohio Agricultural Statistics Service reports that at the end of August, 41 percent of the state had adequate soil moisture and 59 percent had soils short of moisture.

(continued on back)

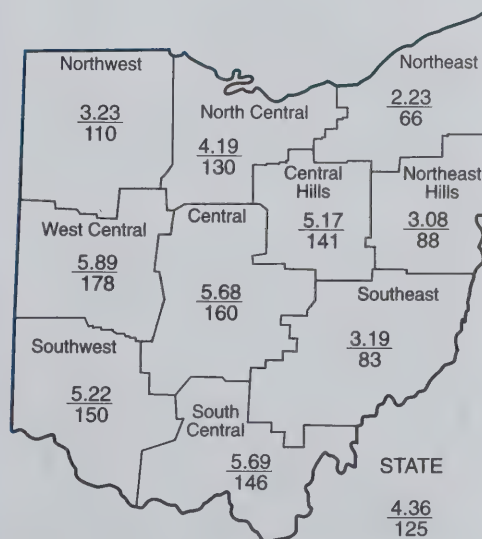
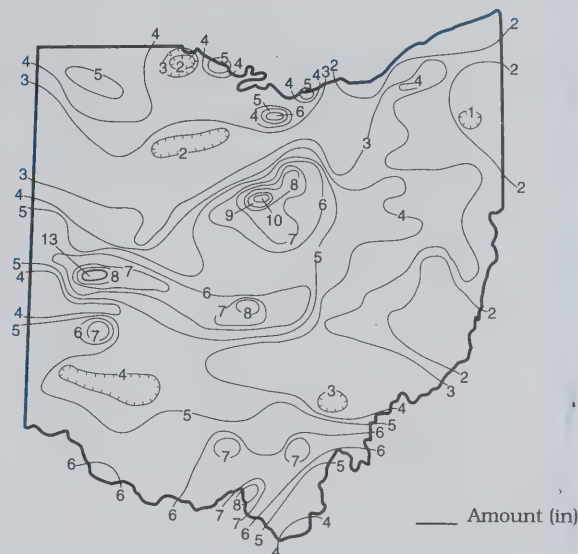
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.30 | -1.34 | -1.19 | -3.83 | -5.93 | -3.4 |
| North Central | +0.96 | +0.79 | +2.49 | +1.68 | +3.87 | -0.9 |
| Northeast | -1.17 | -1.05 | -1.72 | -2.31 | +5.32 | -2.9 |
| West Central | +2.59 | +4.02 | +6.56 | +1.84 | +2.37 | -0.3 |
| Central | +2.13 | +4.74 | +5.22 | +3.51 | +5.34 | +0.5 |
| Central Hills | +1.51 | +0.75 | +1.16 | +0.20 | +5.32 | -1.0 |
| Northeast Hills | -0.44 | -1.59 | -2.73 | -3.88 | +3.34 | -2.8 |
| Southwest | +1.75 | +1.26 | +4.86 | +0.24 | +1.83 | 0.0 |
| South Central | +1.80 | +0.33 | +0.05 | -1.26 | +4.28 | -3.2 |
| Southeast | -0.65 | -2.00 | -1.94 | -3.03 | +4.16 | -1.9 |
| State | +0.88 | +0.60 | +1.28 | -0.67 | +3.02 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION AUGUST 1995



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 62 | 55 | 39 | 62 | 68 |
| Great Miami River at Hamilton | 3,630 | 6,415 | 692 | 263 | 128 | 96 |
| Huron River at Milan | 371 | 108 | 225 | 183 | 104 | 87 |
| Killbuck Creek at Killbuck | 464 | 273 | 213 | 139 | 86 | 82 |
| Little Beaver Creek near East Liverpool | 496 | 137 | 132 | 168 | 75 | 78 |
| Maumee River at Waterville | 6,330 | 1,589 | 238 | 152 | 94 | 69 |
| Muskingum River at McConnelsville | 7,422 | 6,057 | 230 | 143 | 88 | 91 |
| Scioto River near Prospect | 567 | 811 | 1,993 | 380 | 150 | 121 |
| Scioto River at Higby | 5,131 | 7,864 | 672 | 309 | 135 | 115 |
| Stillwater River at Pleasant Hill | 503 | 829 | 1,417 | 270 | 123 | 86 |

STREAMFLOW during August was noticeably above normal throughout most of Ohio with only the extreme northeast corner of the state having below normal flows. Flows were high enough to be considered excessive in all but the north-central and northeastern Ohio drainage basins. Flows during August in the southern two-thirds of the state increased unseasonably from the flows recorded during July while decreasing elsewhere. Based on preliminary data, the monthly mean flow of 811 cfs for the Scioto River near Prospect gauging station is the highest for August for its period of record dating back to 1925 (continuous since 1939).

Flows at the beginning of the month were near normal in most of Ohio, but above normal in the central, west-central and southwestern areas of the state. Flows

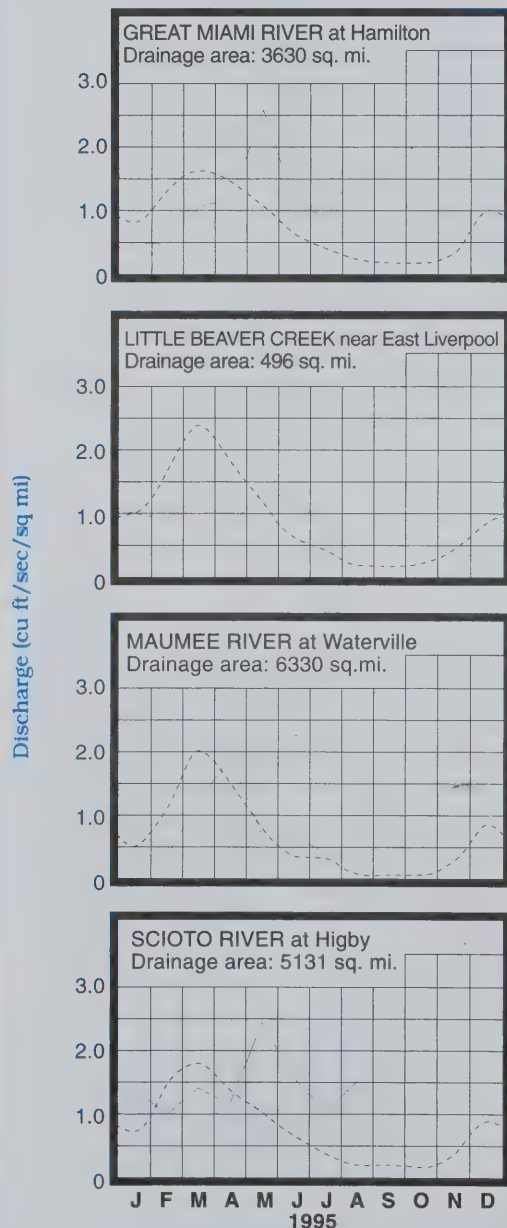
began to rise quickly after August 4 as a frontal system and moisture associated with Tropical Storm Dean and then the remnants of Hurricane Erin passed through the state. Most areas of the state recorded their greatest flows during August 6-9 following these storms. Significant small stream and urban flooding occurred in many areas, but several communities in central and west-central Ohio were impacted the greatest (see Notes and Comments on the last page of this report). Flows declined through the end of the month following these storms with slight increases noted following local precipitation, especially during August 18-19. Lowest flows for August were observed at the end of the month following ten or more days without precipitation in most areas of the state. Month-end flows were noticeably below normal in many areas, but still above normal in the central, west-central and southwestern Ohio drainage basins.

RESERVOIR STORAGE for water supply during August declined seasonally in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 84 percent of rated capacity for water supply compared with 94 percent for last month and 79 percent for August 1994. Month-end storage in the Scioto basin index reservoirs was 95 percent of rated capacity for water supply compared with 102 percent for last month and 78 percent for August 1994.

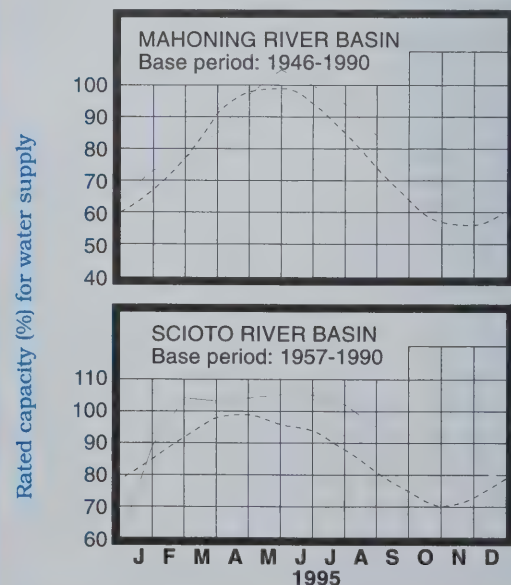
Surface-water supplies remain at acceptable levels in most areas of the state, but with the high temperatures and lack of precipitation during the second half of August, demand was high and some small water-supply reservoirs have reported levels low enough to cause some concern.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

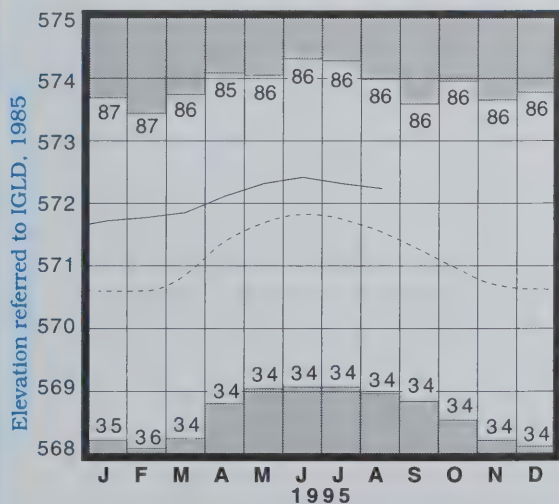
GROUND-WATER LEVELS during August showed net declines in most areas of Ohio, but a few consolidated aquifers showed a little positive improvement due to this month's precipitation and/or delayed recharge from locally above normal precipitation during July. Net declines during August from those levels observed during July were about what is normally observed in most areas of the state. Generally, ground water levels in most shallow, unconsolidated aquifers rose sharply following the widespread precipitation during August 7-10 and then declined during the second half of the month. Levels in most deeper aquifers were either stable throughout the month or stable during the first half and then slowly declined during the second half.

As a result of the above normal precipitation during the past few months in many areas of Ohio, ground water levels have been able to maintain higher levels than those observed last year at this time. Ground water levels are slightly above normal in many areas of the state, but levels remain below normal in many aquifers in northeastern, eastern and southeastern Ohio where summer precipitation has not been as favorable. The next few months are typically the driest time of the year when ground water storage is at its lowest level; therefore, water supply managers with ground water sources, especially in the eastern areas of Ohio, should monitor their situations during the next few months until significant recharge is observed later this year or early next year.

LAKE ERIE level declined during August. The mean level was 572.24 feet (IGLD-1985), 0.07 foot below last month's mean level and 0.68 foot above normal. This month's level is 0.43 foot lower than the August 1994 level and 3.04 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during August averaged 2.8 inches, 0.4 inch below normal. The entire Great Lakes basin averaged 4.0 inches of precipitation during August, 0.9 inch above normal. For calendar year 1995 through August, the Lake Erie basin has averaged 22.4 inches of precipitation, 1.2 inches below normal and the entire Great Lakes basin has averaged 20.6 inches, 0.4 inch below normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

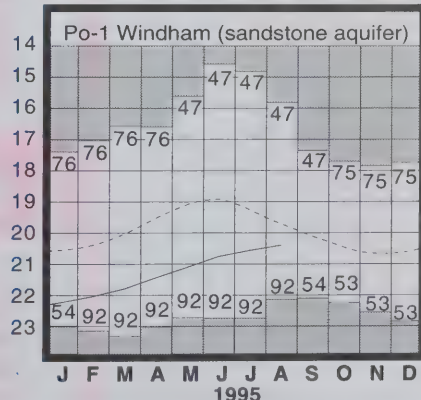
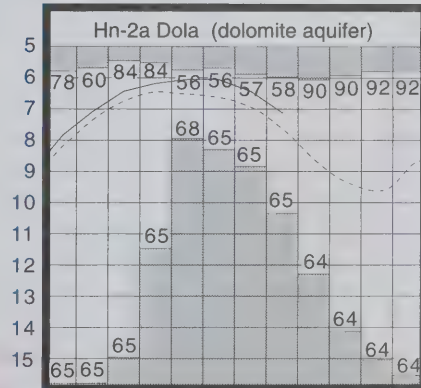
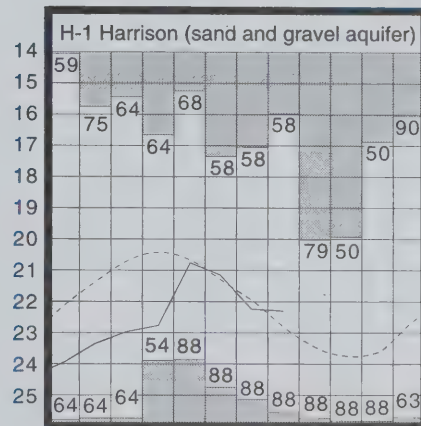
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.43 | +0.36 | +0.18 | +4.14 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.98 | +0.30 | -0.35 | +0.77 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.85 | +1.17 | -0.38 | +0.84 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.30 | +0.51 | -0.07 | +1.51 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.14 | +0.52 | -0.70 | -0.06 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.40 | -0.68 | +0.18 | +0.57 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.79 | -1.70 | -0.35 | +0.24 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Record high and low, year of occurrence

Normal - - - -

Current ———

(continued from front page)

Precipitation for the 1995 calendar year is above normal throughout most of Ohio but below normal in the eastern and northwestern areas of the state. The state average is 28.49 inches, 1.49 inches above normal. Regional averages range from 33.28 inches, 5.85 inches above normal, for the Central Region to 22.33 inches, 1.61 inches below normal, for the Northwest Region.

Precipitation for the 1995 water year is above normal in the central, west-central and southwestern areas of Ohio but below normal in the eastern, northwestern and south-central areas. The state average is 35.06 inches, 0.49 inch above normal. Regional averages range from 39.41 inches, 4.69 inches above normal, for the Central Region to 29.06 inches, 1.91 inches below normal, for the Northwest Region.

SUMMARY

Precipitation was above normal in many areas of Ohio but below normal in much of the eastern and northern areas of the state. Streamflow was noticeably above normal in all but the extreme northeastern Ohio drainage basins. Small stream and urban flooding during August 8-10 resulted in ten counties receiving federal disaster declarations. Reservoir storage declined seasonally and was above normal in many areas but slightly below normal in some smaller water-supply reservoirs. Ground water levels declined seasonally in most aquifers. Ground water levels are slightly above normal in most areas of the state, but continue to remain below normal in the eastern and northeastern Ohio aquifers. Lake Erie level declined and was 0.68 foot above the long-term August average.

NOTES AND COMMENTS

AUGUST STORMS RESULT IN DISASTER DECLARATION

At the request of Governor George V. Voinovich, President Clinton declared parts of Ohio major disaster areas as a result of heavy, localized rain storms in early August. The declaration includes Champaign, Erie, Licking, Logan, Lorain, Marion, Mercer, Miami, Scioto and Shelby counties. The storms caused an estimated \$15 million in flood damage losses to more than 3,000 homeowners and hundreds of businesses. Crop damage will not be evident until the harvest is completed in the impacted counties. The federal declaration enables flood victims to apply for assistance provided by the federal government. This assistance includes low interest loans, grants, and technical assistance to reduce exposure from future floods.

These storms were the result of moisture being funnelled into the state from a slow moving frontal system coupled with the remnants of Tropical Storm Dean and Hurricane Erin. The storms started on August 4-5 as soaking rains and showers mainly in the southern and north-central areas of the state. During the night of August 7-8, heavy storms dumped up to nearly 11 inches of rain on parts of Miami, Shelby, Logan and Champaign counties. The communities of St. Paris (Champaign County) and Piqua (Miami County) were severely impacted. These storms also produced heavy rain (more than 5 inches) in Marion County, where Prospect was hard hit, and in Mercer County, where Fort Recovery received the brunt of the storm. Storms developed again the next night (August 8-9) with Licking, Lorain and Erie counties receiving up to 5 inches of rain. The unincorporated area of Marne (Licking County) was impacted severely. Storms developed again during August 9-10 as the slow moving storm system finally began to leave the Ohio Valley. Locally severe storms with intense, heavy rain caused flash floods in portions of southeastern Ohio. Washington and Scioto counties were hardest hit. Flooded roads in Scioto County resulted in the deaths of three people when their car was unable to make it through deep flood waters.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Donald C. Anderson
Director

Michele Wallis
Chief

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1995

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R1-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during September was noticeably below normal throughout the state. The state average was 1.39 inches, 1.61 inches below normal, which ranks as the seventh driest September during the last 113 years of record. Regional averages ranged from 2.11 inches, 1.07 inches below normal, for the South Central Region to 0.98 inch, 1.87 inches below normal, for the Northwest Region. Gallipolis Locks and Dam (Gallia County) reported the greatest amount of precipitation for the month, 3.83 inches. Congress (Wayne County) and Ottawa (Putnam County) both reported 0.33 inch of rain in September, the least amount of all reporting stations.

Most of the precipitation fell during the middle of the month as the first and last seven days of September were noticeably dry statewide. Light showers fell during September 7-9 in many areas of the state with the greatest amounts observed in extreme western Ohio. Showers were widespread in the southern two-thirds of Ohio during September 11-15 with amounts of more than 0.5 inch reported at many locations. The month's heaviest storms occurred during September 14-15 mainly in extreme southeastern Ohio along the Ohio River with 1 to 2 inches reported at some locations. The third full week of the month was the wettest as far as the number of days with precipitation in many areas of Ohio with scattered, light showers falling throughout September 17-21. Amounts during this period averaged around 0.5 inch statewide.

Precipitation for the 1995 calendar year is above normal in the western, southwestern, central and north-central areas of the state, but below normal in the northwestern, eastern and southeastern areas. The state average is 29.90 inches, 0.10 inch below normal. Regional averages range from 33.82 inches, 1.74 inches above normal, for the Southwest Region to 23.34 inches, 3.45 inches below normal, for the Northwest Region.

Precipitation for the 1995 water year was above normal in the western, southwestern, central and north-central areas of the state, but below normal in the northwestern and eastern areas. The state average was 36.47 inches, 1.10 inches below normal. Regional averages ranged from 40.71 inches, 0.44 inch above normal, for the Southwest Region to 30.07 inches, 3.75 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Piqua (Miami County) reported the greatest amount of precipitation for the water year, 50.77 inches, of which 13.84 inches fell during August. Hicksville (Defiance County) reported the least amount of precipitation for the water year, 27.45 inches; Toledo Express Airport (Lucas County) reported 27.47 inches, the second lowest amount of all reporting stations. An isohyetal map and regional averages with percentages of normal precipitation for the 1995 water year appear on the last page of this report.

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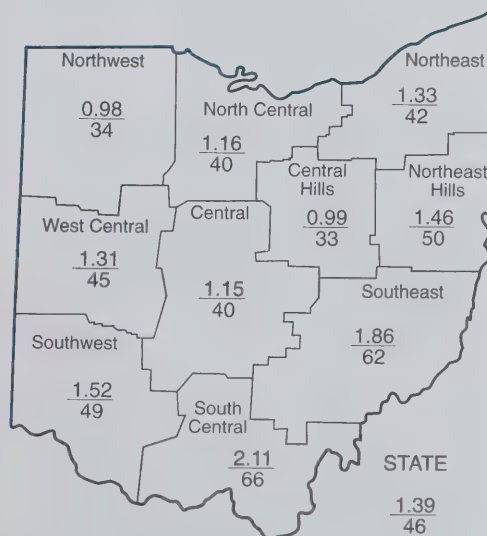
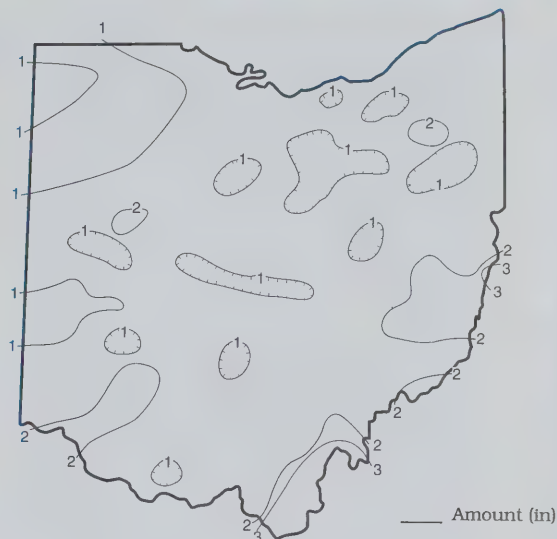
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.87 | -3.17 | -1.84 | -3.75 | -9.54 | -3.1 |
| North Central | -1.72 | -0.26 | +2.08 | +1.18 | +1.21 | -1.3 |
| Northeast | -1.85 | -2.47 | -1.85 | -3.27 | +1.70 | -2.9 |
| West Central | -1.62 | +1.86 | +5.94 | +1.78 | -0.36 | -0.6 |
| Central | -1.74 | +0.54 | +4.67 | +2.30 | +2.37 | -0.7 |
| Central Hills | -2.04 | -1.05 | +1.27 | -0.24 | +2.91 | -1.5 |
| Northeast Hills | -1.48 | -3.67 | -2.29 | -4.59 | +0.11 | -2.4 |
| Southwest | -1.57 | -0.62 | +4.97 | +0.44 | +0.20 | -1.0 |
| South Central | -1.07 | -0.99 | +1.06 | -1.84 | +2.88 | -2.1 |
| Southeast | -1.13 | -3.37 | -0.99 | -3.28 | +2.35 | -1.8 |
| State | -1.61 | -1.31 | +1.31 | -1.10 | +0.43 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION SEPTEMBER 1995

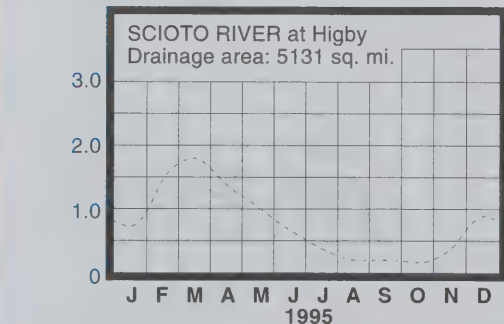
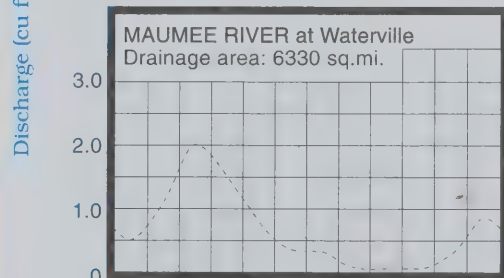
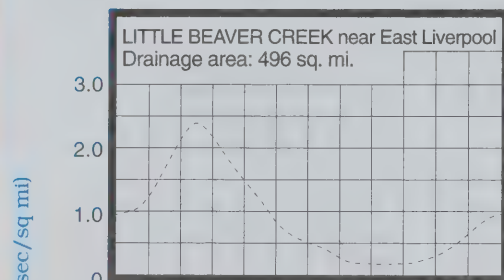
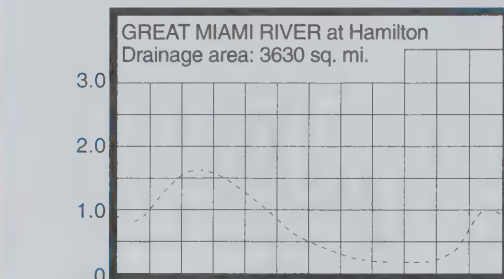


Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 9 | 4 | 24 | 55 | 67 |
| Great Miami River at Hamilton | 3,630 | 1,052 | 137 | 315 | 154 | 96 |
| Huron River at Milan | 371 | 20 | 61 | 126 | 129 | 87 |
| Killbuck Creek at Killbuck | 464 | 77 | 76 | 127 | 92 | 81 |
| Little Beaver Creek near East Liverpool | 496 | 52 | 57 | 118 | 83 | 77 |
| Maumee River at Waterville | 6,330 | 240 | 38 | 116 | 91 | 69 |
| Muskingum River at McConnelsville | 7,422 | 1,371 | 70 | 117 | 92 | 90 |
| Scioto River near Prospect | 567 | 34 | 110 | 561 | 221 | 121 |
| Scioto River at Higby | 5,131 | 1,054 | 86 | 273 | 165 | 115 |
| Stillwater River at Pleasant Hill | 503 | 52 | 105 | 376 | 159 | 87 |

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current

STREAMFLOW during September was below normal in most areas of Ohio, but some drainage basins in the western and central areas of the state had above normal flows where unusually heavy rain fell in August. Flows in many northern and eastern Ohio drainage basins were low enough to be considered deficient. Flows during September were noticeably less than the excessive flows observed during August. Based on preliminary data, the monthly mean flow of 9 cfs for the Grand River near Painesville gauging station is the lowest for its period of record (21 years).

Flows at the beginning of September were below normal in the northern and eastern areas of the state and above normal in the central, western and southwestern areas. Generally, flows declined slowly during the first twelve days of the month and then increased following some of the month's most widespread precipitation during September 11-15. The greatest flows for September were observed during this period in most drainage basins. Flows slowly declined in most basins through the end of the month at which time September's lowest flows were observed. An exception was in some northeastern drainage basins where slightly lower flows were recorded early in the month. Flows at the end of the month were noticeably below normal throughout the state.

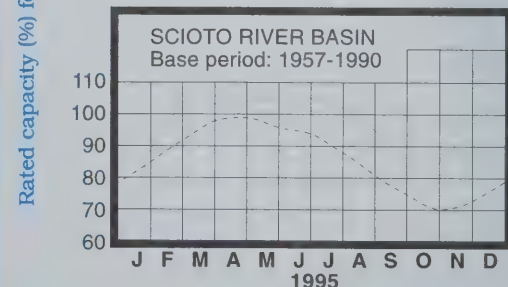
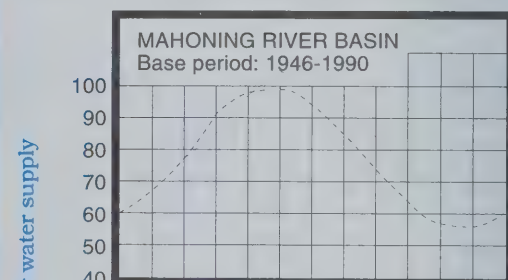
Streamflow for the 1995 water year was below normal in most areas of the state but above normal in central Ohio (see Mean Stream Discharge table, past 12 months column). Flows in the northern Ohio drainage basins were low enough to be considered deficient. Generally, flows were below normal during the first half of the water year and above normal during the second half. Minor flooding was reported during January and April. Several locally severe storms caused small stream and urban flooding as well as flash flooding during the late spring and summer months. Several counties were declared disaster areas after flooding during the early part of August.

RESERVOIR STORAGE for water supply during September decreased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of September in the Mahoning River basin index reservoirs was 75 percent of rated capacity for water supply compared with 84 percent for last month and 72 percent for September 1994. Month-end storage in the Scioto River basin index reservoirs was 86 percent of rated capacity for water supply compared with 95 percent for last month and 68 percent for September 1994.

Surface-water supplies at the beginning of the 1995 water year were above normal in the Mahoning basin reservoirs but noticeably below normal in the Scioto basin reservoirs. Storage in the Scioto basin reservoirs recovered to above normal levels during the winter months. Above normal precipitation during the late spring and summer months resulted in ample streamflow and reduced demand, both of which were beneficial for surface-water supplies. Storage in both basins remained at above normal levels through the end of the 1995 water year.

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND WATER LEVELS during September declined throughout Ohio. Net declines during September from those levels recorded during August were greater than usually observed in most aquifers. Ground water levels declined steadily throughout the month in response to the below normal precipitation during the second half of August and throughout September.

Summer precipitation has been greater during 1995 than during 1994 in many areas of Ohio and as a result, ground water levels are higher than those observed last year in most areas of the state. The only noticeable exception is in northwestern Ohio where the summer 1995 precipitation has been less than last year's and current ground water levels are lower. Ground water levels are slightly above normal in many areas of the state, but continue to remain at below normal levels in many aquifers in eastern, northeastern and southeastern Ohio where precipitation was noticeably below normal much of last year and summer 1995 precipitation has not been as favorable.

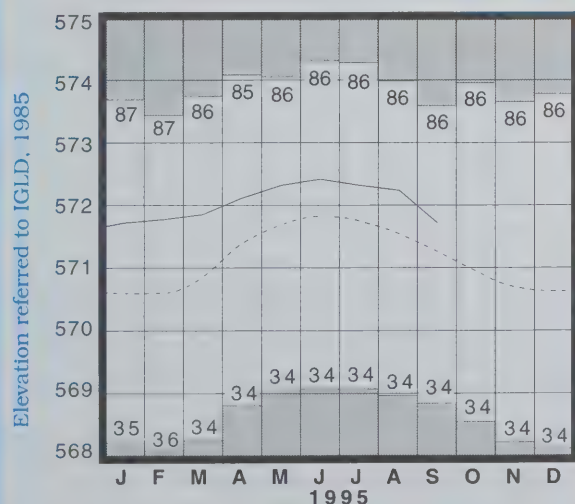
Ground water levels were noticeably below normal at the beginning of the 1995 water year. Below normal precipitation throughout most of the fall 1994, late winter 1995 and early spring 1995 months resulted in very little improvement in ground water storage. Conditions began to improve during the late spring and early summer months in most areas of the state as precipitation was near or above normal. Summer precipitation was abundant in many areas of Ohio which slowed the natural seasonal decline of ground water levels; however, in much of the eastern, northeastern and southeastern areas of the state, summer precipitation was not as favorable and ground water levels returned to below normal levels at the end of the water year.

LAKE ERIE level declined noticeably during September. The mean level was 571.72 feet (IGLD-1985), 0.52 foot below last month's mean level and 0.46 foot above normal. This month's level is 0.59 foot below the September 1994 level and 2.52 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during September averaged 1.1 inches, 2.0 inches below normal. The entire Great Lakes basin averaged 2.7 inches of precipitation during July, 0.7 inch below normal. For calendar year 1995 through September, the Lake Erie basin has averaged 23.4 inches of precipitation, 3.3 inches below normal and the entire Great Lakes basin has averaged 23.1 inches, 1.3 inches below normal.

Lake Erie remained above the long-term average level throughout the 1995 water year. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the next several months. Variations in weather conditions during the next six months could alter the projected level by as much as one foot either way.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

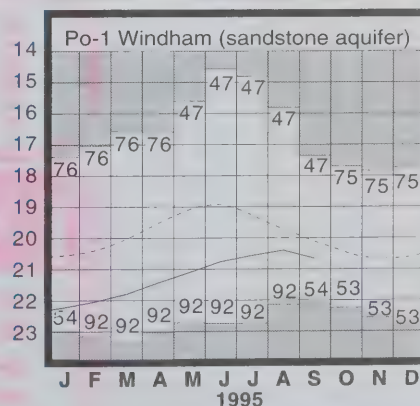
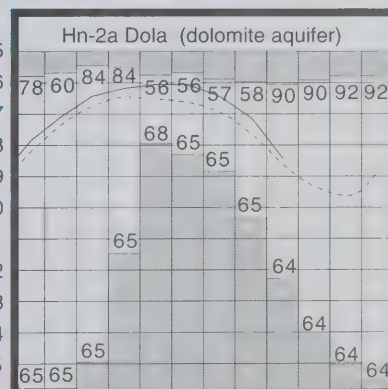
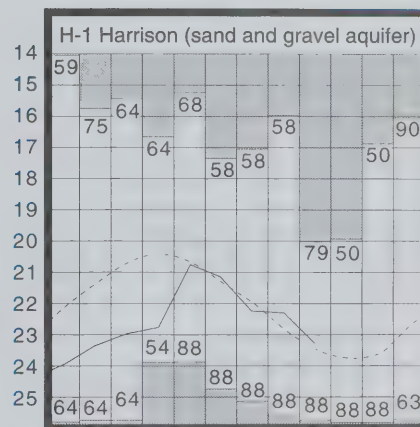
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 16.68 | -0.26 | -1.25 | +3.27 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.47 | +0.20 | -0.49 | +0.68 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.53 | +0.97 | -0.68 | +1.13 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.29 | +0.18 | -0.99 | +0.94 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 8.43 | +0.18 | -1.29 | -0.83 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.67 | -0.55 | -0.27 | +0.63 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.53 | -2.02 | -0.74 | +0.01 |

GROUND-WATER LEVELS

Water level (ft below land surface)



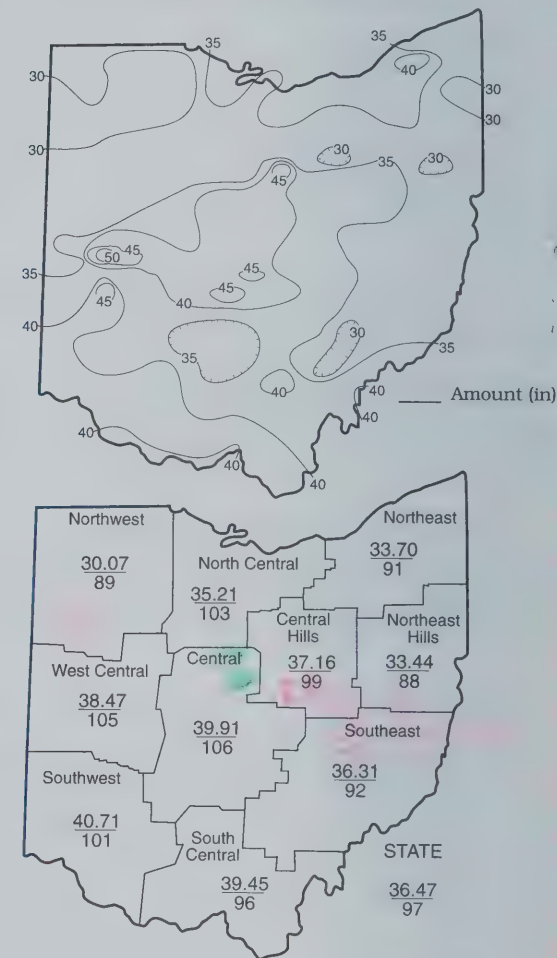
Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

The 1995 water year started off with noticeably below normal precipitation as October 1994 was the tenth driest on record. Precipitation was near or above normal during November, December and January, but returned to unusually below normal levels during February and March. Precipitation during April was above normal in the central and western areas of the state but continued to be below normal in the eastern and south-central areas. Precipitation was noticeably above normal in May, ranking as the eighth wettest on record, and also in June, which caused some delays in the planting of agricultural crops. Many areas of the state had below normal precipitation during July, but the central, west-central and northeastern areas had above normal precipitation. August precipitation was above normal in the eastern two-thirds of Ohio but continued to be below normal in the eastern one-third. The water year ended as it began with noticeably below normal precipitation throughout the state with September being the seventh driest on record. Even with below normal precipitation in many areas during the 1995 water year, water supplies were adequate throughout the year.

TOTAL PRECIPITATION 1995 WATER YEAR



SUMMARY

Precipitation was noticeably below normal statewide with the month's average of 1.39 inches ranking as the seventh driest September on record. Streamflow was below normal in all but the central and western areas of the state. Reservoir storage decreased seasonally but remained at above normal levels. Ground water levels declined and are below normal in the eastern and northeastern Ohio aquifers. Lake Erie level declined 0.52 foot and was 0.46 foot above the long-term September average.

Precipitation for the 1995 water year was below normal in northwestern and eastern Ohio and above normal elsewhere. Annual streamflow was below normal in all but the central Ohio drainage basins where it was above normal. Reservoir storage was above normal throughout most of the water year. Ground water levels were generally above normal in the western half of the state and below normal in the eastern half throughout the water year. Lake Erie level remained above normal throughout the water year as it has been for quite some time.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Vohnovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

October 1995

A2-186

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

NO 29 '95

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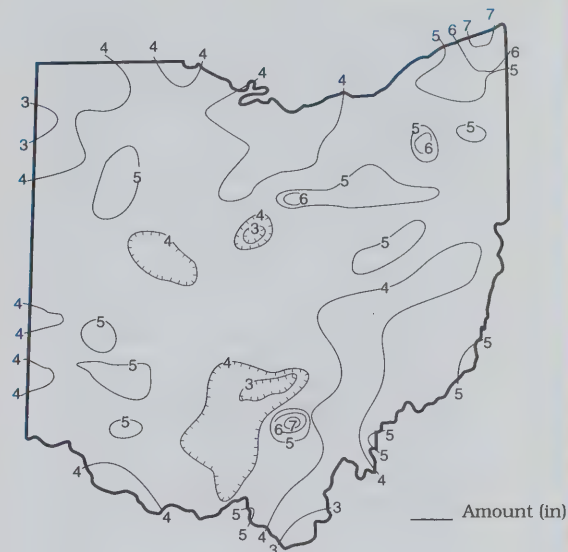
PRECIPITATION during October was above normal throughout the state, and in some areas, noticeably above normal. October is traditionally one of the driest months of the year. The state average was 4.41 inches, 2.07 inches above normal, which ranks as the eleventh wettest October during the past 113 years of record. Regional averages ranged from 5.20 inches, 2.94 inches above normal, for the Central Hills Region to 3.78 inches, 1.54 inches above normal, for the South Central Region. McArthur (Vinton County) reported the greatest amount of precipitation for the month, 7.06 inches; Ashtabula (Ashtabula County) reported 7.00 inches. Laurelville (Hocking County) reported the least amount of precipitation during October, 2.78 inches.

Precipitation during October fell as rain. In many areas of the state most of the precipitation for October fell during the first week of the month. Storms began during October 3-4 and were closely followed by the remnants of Hurricane Opal passing through the state on October 5. This series of storms produced 1-3 inches of rain in most areas of the state, but more than 4 inches were reported at a few locations. The next ten days of the month were autumn-like with little precipitation. Farmers were busy harvesting crops. Storms returned to the state during October 14-15 with some areas in eastern Ohio reporting more than 1 inch of precipitation. There were several days with precipitation during the last ten days of the month, but daily totals were generally light. During this period, storms were heaviest on October 20, especially in northern and northeastern Ohio where up to 1 inch of rain was reported. Precipitation totals for the last ten days of the month ranged from 0.5 to 1 inch at most of the remaining locations.

Precipitation for the 1995 calendar year is above normal throughout most of the state, but below normal in the Northwest, Northeast Hills and Southeast regions. The state average is 34.29 inches, 1.95 inches above normal. Regional averages range from 38.31 inches, 3.84 inches above normal, for the Southwest Region to 27.42 inches, 1.66 inches below normal, for the Northwest Region.

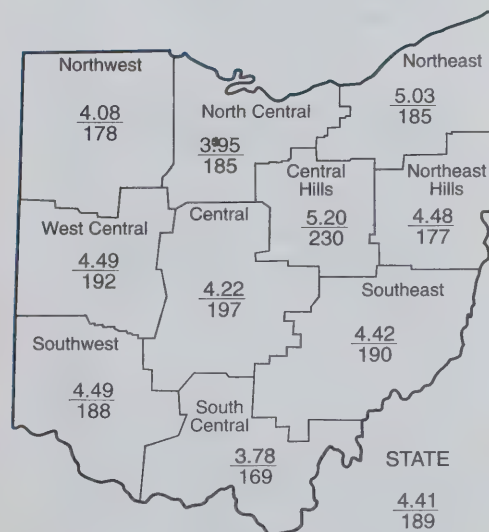
The 1996 water year is off to a good start as far as precipitation is concerned with October 1995 being the eleventh wettest October on record. The Ohio Agricultural Statistics Service reports that near the end of October soil moisture was considered as being short in 8 percent of the state, adequate in 79 percent of the state and surplus in 13 percent of the state. Conditions are favorable for water supply replenishment during the upcoming recharge season; however, near normal precipitation and other climatic conditions will be necessary to initiate and continue the improvement through the spring 1996.

PRECIPITATION OCTOBER 1995



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.79 | +0.27 | -1.19 | -0.56 | -7.22 | -0.2 |
| North Central | +1.81 | +0.98 | +2.32 | +4.45 | +2.64 | +0.2 |
| Northeast | +2.31 | -0.71 | +0.57 | +0.29 | +3.49 | +0.2 |
| West Central | +2.15 | +2.93 | +7.41 | +5.57 | +1.65 | +2.4 |
| Central | +2.08 | +2.43 | +6.73 | +5.76 | +3.65 | +1.1 |
| Central Hills | +2.94 | +2.41 | +3.82 | +4.21 | +5.44 | +0.9 |
| Northeast Hills | +1.95 | +0.03 | +0.28 | -0.89 | +1.75 | +0.3 |
| Southwest | +2.10 | +2.28 | +6.86 | +3.96 | +1.29 | +0.8 |
| South Central | +1.54 | +2.06 | +3.99 | +0.98 | +3.50 | +0.8 |
| Southeast | +2.09 | +0.56 | +2.10 | +0.28 | +3.53 | +0.7 |
| State | +2.07 | +1.32 | +3.29 | +2.43 | +2.01 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 137 | 39 | 16 | 37 | 68 |
| Great Miami River at Hamilton | 3,630 | 2,093 | 276 | 328 | 211 | 101 |
| Huron River at Milan | 371 | 69 | 205 | 125 | 142 | 89 |
| Killbuck Creek at Killbuck | 464 | 179 | 180 | 153 | 126 | 84 |
| Little Beaver Creek near East Liverpool | 496 | 120 | 100 | 89 | 114 | 77 |
| Maumee River at Waterville | 6,330 | 834 | 137 | 101 | 87 | 70 |
| Muskingum River at McConnelsville | 7,422 | 2,712 | 144 | 149 | 114 | 92 |
| Scioto River near Prospect | 567 | 171 | 617 | 580 | 265 | 124 |
| Scioto River at Higby | 5,131 | 2,556 | 277 | 276 | 226 | 118 |
| Stillwater River at Pleasant Hill | 503 | 271 | 457 | 570 | 256 | 91 |

STREAMFLOW during October was above normal throughout most of Ohio with only the extreme northeastern area of the state having below normal flows. Flows in most drainage basins in the southern two-thirds of the state were high enough to be considered excessive, while in the Grand River basin, it was low enough to be considered deficient.

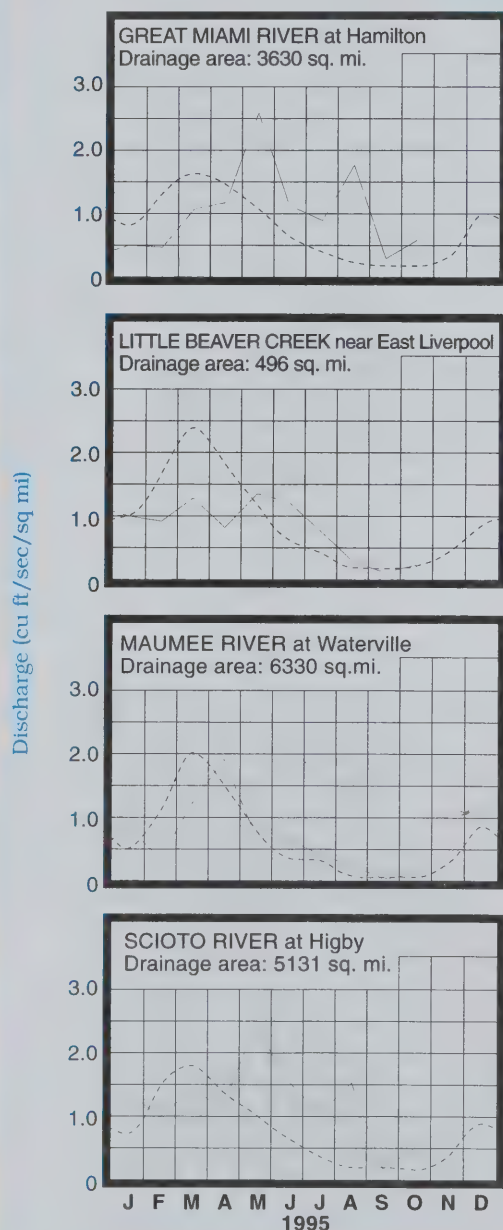
Flows at the beginning of October were noticeably below normal throughout most of Ohio as a result of the markedly below normal precipitation during September. Lowest flows for the month occurred during October 1-3 in all drainage basins. Flows increased sharply following widespread precipitation during October 3-5. Most drainage basins had their highest flows for the month during October 6-7 following these storms. Following these peaks, flows declined slowly through

the end of the month with slight increases noted following local precipitation in most areas of the state. In northeastern Ohio, somewhat greater increases were observed especially after the October 20 storms. Flows at the end of the month were above normal in all but the northeastern drainage basins where they were below normal.

RESERVOIR STORAGE for water supply during October decreased seasonally in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

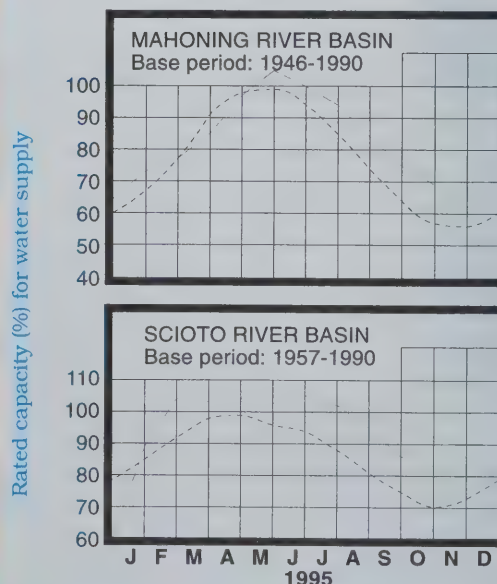
Reservoir storage at the end of October in the Mahoning basin index reservoirs was 69 percent of rated capacity for water supply compared with 75 percent for last month and 66 percent for October 1994. Month-end storage in the Scioto basin index reservoirs was 83 percent of rated capacity for water supply compared with 86 percent for last month and 58 percent for October 1994. Surface water supplies are at favorable levels after the first month of the 1996 water year.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



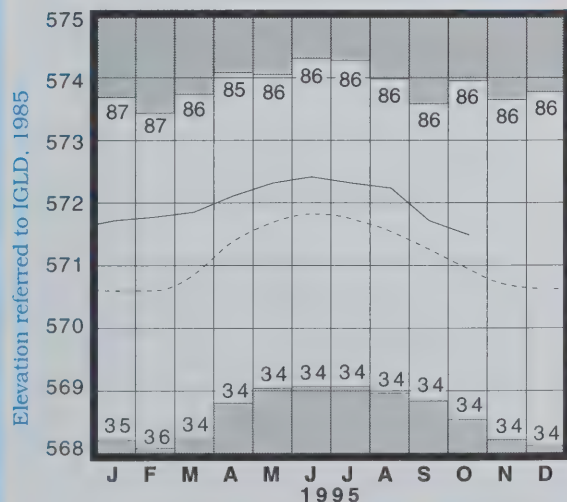
GROUND WATER LEVELS during October showed mixed responses across the state, but most aquifers showed net declines during the month. Declines observed during October from those levels recorded during September were near or slightly greater than usual. Aquifers showing net rises during the month were generally located in the central, western, and southwestern areas of the state.

Ground water levels continue to remain below normal throughout most of the eastern half of the state, but are in better condition at the start of the 1996 water year than they were at the start of the 1995 water year. Ground water levels range from slightly lower than last year's levels in the northwestern area of the state to nearly three feet higher in some eastern areas. The above normal precipitation during October has improved the soil moisture conditions in many areas of the state and bodes well for continued improvement to ground water storage during the upcoming recharge season.

LAKE ERIE level declined during October. The mean level was 571.49 feet (IGLD-1985), 0.23 foot below last month's mean level and 0.53 foot above normal. This month's level is 0.10 foot below the October 1994 level and 2.29 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during October averaged 3.6 inches, 0.9 inch above normal. The entire Great Lakes basin averaged 4.5 inches of precipitation during October, 1.7 inches above normal. For calendar year 1995 through October, the Lake Erie basin has averaged 27.0 inches of precipitation which is 2.5 inches below normal and the entire Great Lakes basin has averaged 27.6 inches, which is 0.4 inch above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

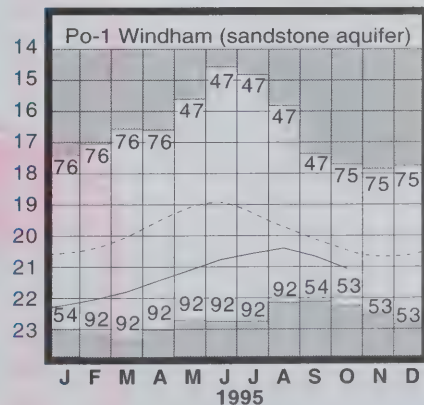
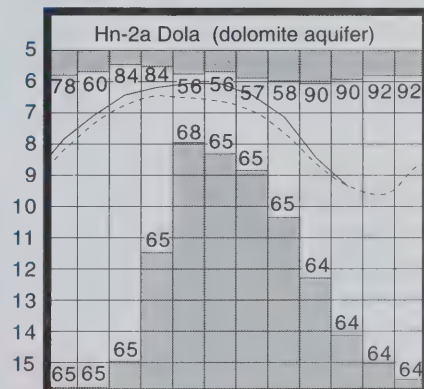
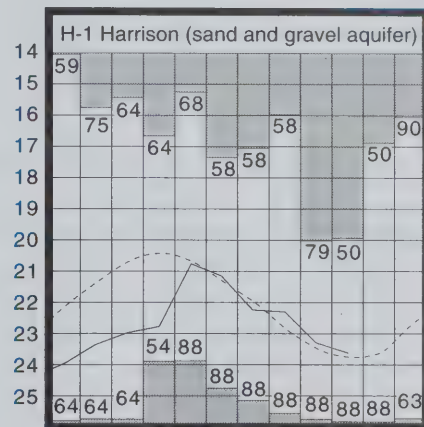
Record high and low, year of occurrence

GROUND-WATER LEVELS

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.99 | -1.10 | -1.31 | +2.96 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.33 | +0.68 | +0.14 | +1.30 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.36 | +1.08 | +0.17 | +1.82 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.61 | +0.15 | -0.32 | +1.00 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 9.38 | -0.05 | -0.95 | -0.73 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.07 | -0.60 | -0.40 | +0.65 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.92 | -2.31 | -0.39 | +0.04 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation was above normal throughout the state. Streamflow was above normal in all but the extreme northeastern Ohio drainage basins. Reservoir storage declined but remained at above normal seasonal levels. Ground water levels declined in most aquifers, but rose in some aquifers in the southwestern quadrant of the state. Lake Erie level declined 0.23 foot and was 0.53 foot above the long-term October average.

NOTES AND COMMENTS

In September, the Division of Water staff met to develop mission and vision statements and a list of guiding principles and values. This is part of the Division's and Department's efforts to implement Quality Services through Partnerships (Ohio's total quality initiative) and to develop a common purpose and direction among all the Division employees. The Division of Water wants to share them with you. If you have any questions or comments, please call (614) 265-6717.

Division of Water

Mission

A unified team serving the citizens of Ohio by providing stewardship of one of our most valuable resources - WATER - to ensure its heritage and viability for all generations.

Vision

A team of professionals leading in water resource management utilizing innovative technology and partnerships to achieve the highest quality customer service.

Guiding Principles and Values

We value our role as stewards of Ohio's water resources and recognize the diversity and needs of our customers.

- To provide timely, quality service and accurate information.
- To practice high professional and ethical standards.
- To promote and implement teamwork and partnerships.
- To meet or exceed customer expectations for service and information.
- To practice good water management and protection.
- To encourage professional development through training and education.
- To use best available and innovative technology.
- To promote public education and awareness of water management.
- To provide positive work atmosphere and promote pride in job.
- To continually evaluate/improve division programs, policies, and statutory mandates per Ohio Revised Code.
- To be recognized for outstanding achievements by external peers and internal customers (i.e. striving for excellence).

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

November 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

JA 02 '96

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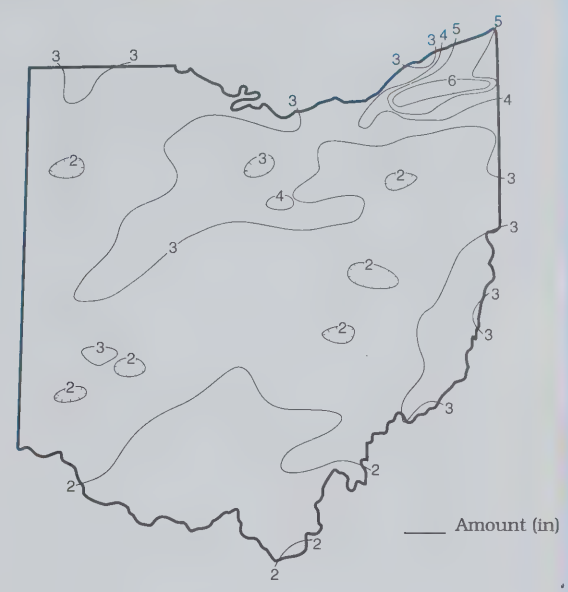
PRECIPITATION during November was generally above normal in the northern half of the state and below normal in the southern half. The state average was 2.71 inches, 0.06 inch above normal. Regional averages ranged from 3.76 inches, 0.88 inch above normal, for the Northeast Region to 1.93 inches, 0.84 inch below normal, for the South Central Region. Chardon (Geauga County) reported the greatest amount of precipitation for the month, 6.83 inches. Greenup Locks and Dam (Scioto County) reported the least amount, 1.18 inches.

Precipitation during November fell as both rain and snow with temperatures averaging noticeably below normal throughout the month. The month started with several days of precipitation. Many areas of the state received about 1 inch of precipitation by November 7. The month's heaviest storms crossed the state during November 10-11 with another 1 inch of precipitation falling at many locations. Scattered precipitation, mainly in the form of snow, continued to fall during the next week with the greatest amounts reported in the northeastern Ohio snowbelt area. Chardon (Geauga County) reported 23 inches of snow for the month, nearly twice the average amount for November. The last 10 days of the month were much drier in most areas of the state with only small amounts of precipitation reported on a few days.

Precipitation for the 1995 calendar year is above normal throughout most of the state, but below normal in the Northwest, Northeast Hills, and Southeast regions. The state average is 37.00 inches, 2.01 inches above normal. Regional averages range from 40.63 inches, 3.18 inches above normal, for the Southwest Region to 30.11 inches, 1.40 inches below normal, for the Northwest Region.

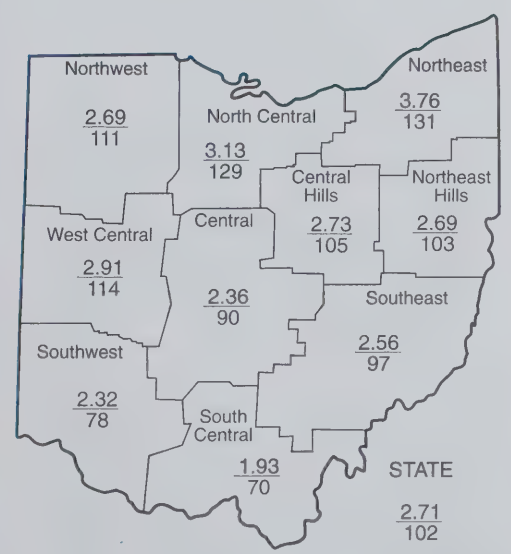
Precipitation for the 1996 water year (October 1, 1995 to September 30, 1996) is above normal throughout the state. The state average is 7.12 inches, 2.13 inches above normal. Regional averages range from 8.79 inches, 3.19 inches above normal, for the Northeast Region to 5.71 inches, 0.70 inch above normal, for the South Central Region.

PRECIPITATION NOVEMBER 1995



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.26 | +0.18 | -1.13 | -1.16 | -7.79 | +1.5 |
| North Central | +0.70 | +0.79 | +1.63 | +4.88 | +1.15 | +1.4 |
| Northeast | +0.88 | +1.34 | +0.61 | +1.01 | +1.84 | +1.4 |
| West Central | +0.35 | +0.88 | +4.67 | +5.53 | -1.44 | +2.7 |
| Central | -0.26 | +0.08 | +3.99 | +5.15 | +0.73 | +1.9 |
| Central Hills | +0.12 | +1.02 | +2.16 | +4.13 | +2.62 | +1.2 |
| Northeast Hills | +0.09 | +0.56 | -1.03 | -2.15 | -0.60 | +0.6 |
| Southwest | -0.66 | -0.13 | +1.13 | +2.88 | -1.33 | +0.7 |
| South Central | -0.84 | -0.37 | -0.25 | +0.06 | +1.25 | +0.8 |
| Southeast | -0.08 | +0.88 | -0.94 | -0.16 | +1.70 | +0.8 |
| State | +0.06 | +0.52 | +1.09 | +2.04 | -0.15 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

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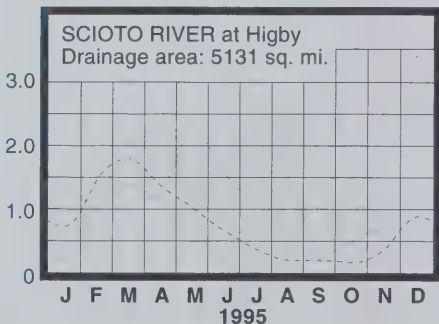
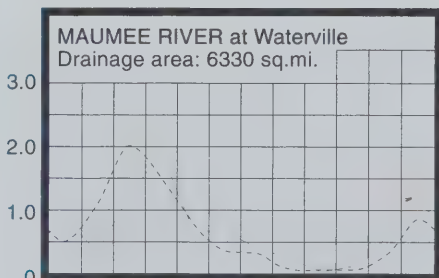
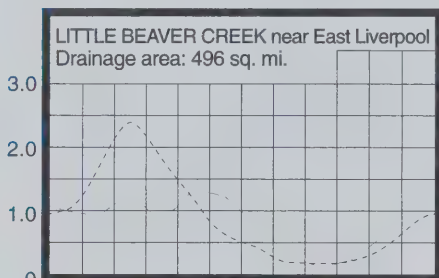
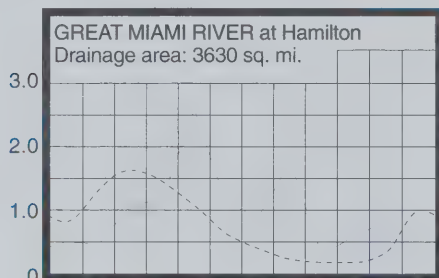
MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,677 | 147 | 88 | 72 | 78 |
| Great Miami River at Hamilton | 3,630 | 3,006 | 230 | 178 | 217 | 107 |
| Huron River at Milan | 371 | 184 | 211 | 116 | 154 | 93 |
| Killbuck Creek at Killbuck | 464 | 309 | 150 | 122 | 128 | 88 |
| Little Beaver Creek near East Liverpool | 496 | 338 | 148 | 93 | 110 | 78 |
| Maumee River at Waterville | 6,330 | 3,474 | 195 | 113 | 109 | 75 |
| Muskingum River at McConnelsville | 7,422 | 5,218 | 111 | 98 | 115 | 95 |
| Scioto River near Prospect | 567 | 510 | 526 | 317 | 340 | 132 |
| Scioto River at Higby | 5,131 | 3,810 | 202 | 153 | 233 | 122 |
| Stillwater River at Pleasant Hill | 503 | 450 | 489 | 269 | 255 | 98 |

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

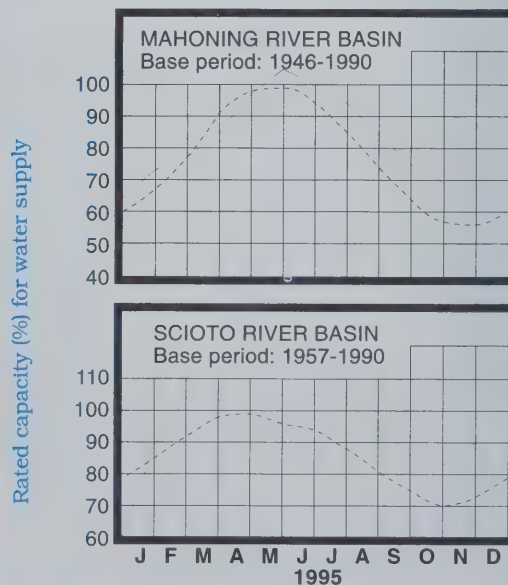
STREAMFLOW during November was above normal throughout the state. Flows in the western, central, and north-central areas of the state were high enough to be considered excessive. Flows increased seasonally during November and were noticeably higher than those flows recorded during October.

Flows at the beginning of November were below normal throughout the state. These were the lowest flows observed for the entire month. Flows increased during the first half of the month after local precipitation, peaking during November 12-14 following the month's heaviest storms. Flows declined through the end of the month with slight increases noted following local precipitation. At the end of November, flows were above normal in the southern two-thirds of the state, but below normal in the northern one-third.

RESERVOIR STORAGE for water supply during November increased in the Scioto basin index reservoirs and was unchanged in the Mahoning basin index reservoirs. Storage remained at above-normal seasonal levels in both basins.

Reservoir storage at the end of November in the Mahoning basin index reservoirs was 69 percent of rated capacity for water supply compared with the same value for last month and 63 percent for November 1994. Month-end storage in the Scioto basin index reservoirs was 90 percent of rated capacity for water supply compared with 83 percent for last month and 52 percent for November 1994. Surface water supplies are in good condition throughout the state.

RESERVOIR STORAGE FOR WATER SUPPLY



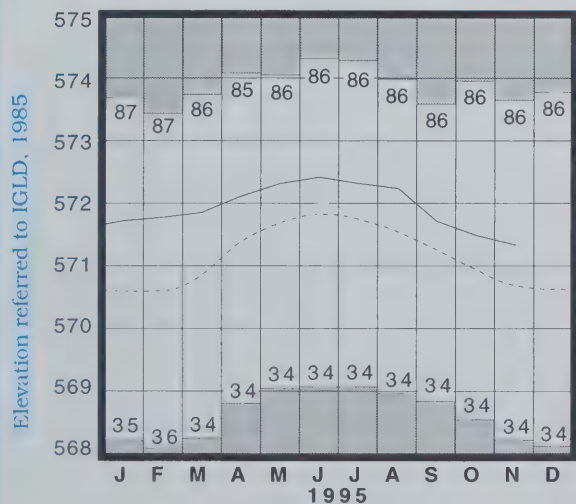
GROUND WATER LEVELS during November showed mixed responses across Ohio, staying stable or rising in many areas, but declining in other areas where precipitation has not been as abundant. Ground water levels across the state are higher than those levels observed a year ago, ranging from slightly above to nearly three feet higher than the November 1994 levels.

Ground water levels continue to remain below normal in much of the eastern half of Ohio. The 1996 water year is off to a good start as far as precipitation is concerned. Conditions appear to be favorable for continued improvement in ground water storage during the 1996 water year recharge period provided climatic conditions are near normal.

LAKE ERIE level declined seasonally during November. The mean level was 571.33 feet (IGLD-1985), 0.16 foot below last month's mean level and 0.63 foot above normal. This month's level is 0.35 foot below the November 1994 level and 2.13 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during November averaged 3.9 inches, 1.1 inches above normal. The entire Great Lakes basin averaged 3.9 inches of precipitation during November, 1.2 inches above normal. For calendar year 1995 through November, the Lake Erie basin has averaged 30.9 inches of precipitation, which is 1.4 inches below normal, and the entire Great Lakes basin has averaged 31.5 inches, which is 1.5 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

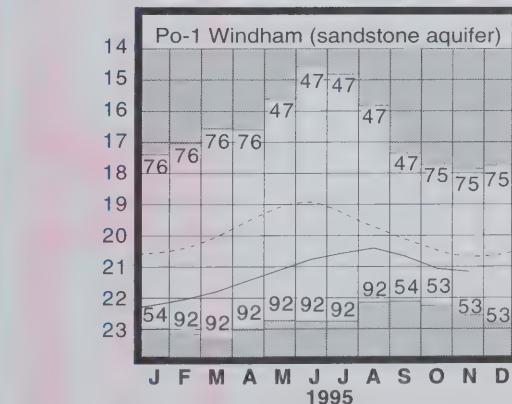
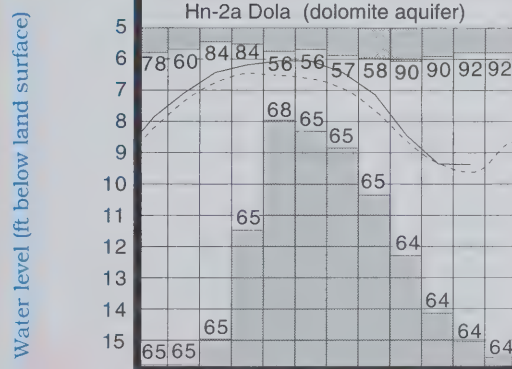
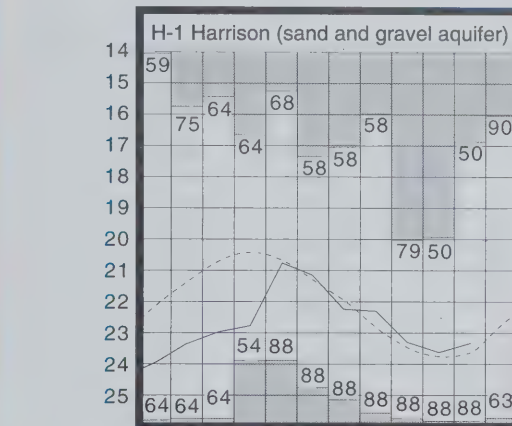
Record high and low, year of occurrence

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 18.70 | -1.44 | -0.71 | +2.76 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.83 | +1.12 | +0.50 | +2.11 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.95 | +1.34 | +0.41 | +1.88 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.32 | +0.34 | +0.29 | +1.17 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 9.39 | +0.24 | -0.01 | +0.01 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.17 | -0.49 | -0.10 | +1.02 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.98 | -2.42 | -0.06 | +0.22 |

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Precipitation was above normal in the northern half of the state and below normal in the southern half. Streamflow was above normal statewide. Reservoir storage was stable or increased and remained at above normal levels. Ground water levels showed mixed responses and are above normal in the western half of the state and below normal in the eastern half. Lake Erie level declined 0.16 foot and was 0.63 foot above the long-term November average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Franklin County
by Michael P. Angle

Ground Water Pollution Potential of Licking County
by Michael P. Angle

Ground Water Pollution Potential of Miami County
by Paul N. Spahr

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring, and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Ground water pollution potential maps have been published for 35 of Ohio's 88 counties. Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

NEW EMPLOYEE JOINS DIVISION OF WATER STAFF

Ken Pendley recently joined the Division of Water staff as an administrative assistant. Initially, his duties will center around the development and administration of the new well log system (more at a later date). Eventually, Ken will assist with the development of programs that will utilize well log and other water resource data in conjunction with the Department of Natural Resources' (ODNR) geographical information management system.

Ken spent the past four years working as an environmental scientist for an international consulting firm writing human-health risk assessments, conducting various types of computer and statistical modeling, and developing environmental databases in support of toxicological studies. Prior to this, Ken worked for the ODNR in the Ohio Capability Analysis Program which utilizes geographical information systems to develop decision making tools for government and non-government users.

Away from work, Ken is an avid golfer and also enjoys fossil collecting. The Pendley family, which includes his wife Francie and their new son Thomas, reside in Galena.

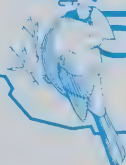
ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources

OHIO



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Donald C. Anderson
Director

Michelle Willis
Chief

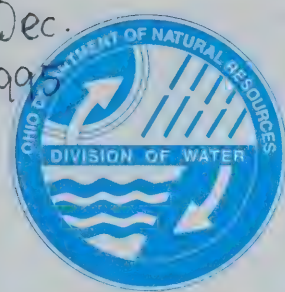
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Dec.
1995

P2-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

December 1995

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during December was below normal throughout most of Ohio with only the Southwest Region having slightly above normal precipitation. The state average was 2.07 inches, 0.51 inch below normal. Regional averages ranged from 2.87 inches, 0.05 inch above normal, for the Southwest Region to 1.02 inches, 1.29 inches below normal, for the Northwest Region. Painesville (Lake County) reported the greatest amount of precipitation for the month, 5.20 inches. Wauseon (Fulton County) reported the least amount, only 0.47 inch.

Precipitation during December fell as both rain and snow. Generally, the southern half of the state received more than two inches of precipitation during the month while the northern half received less than two inches. The exception was in the northeastern Ohio snowbelt area where from two to more than five inches of precipitation fell. Many areas, especially in the northern half of the state, reported above normal snow for the month. Chardon (Geauga County) reported 50.5 inches of snow in December, more than twice the average amount. For the season, Chardon has received about 74 inches of snow through the end of December. Cleveland Hopkins Airport reported 29.6 inches, just shy of its record December amount of 30.3 inches recorded in 1962.

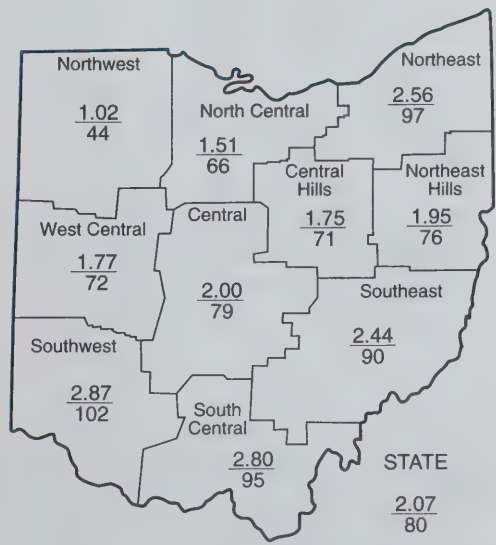
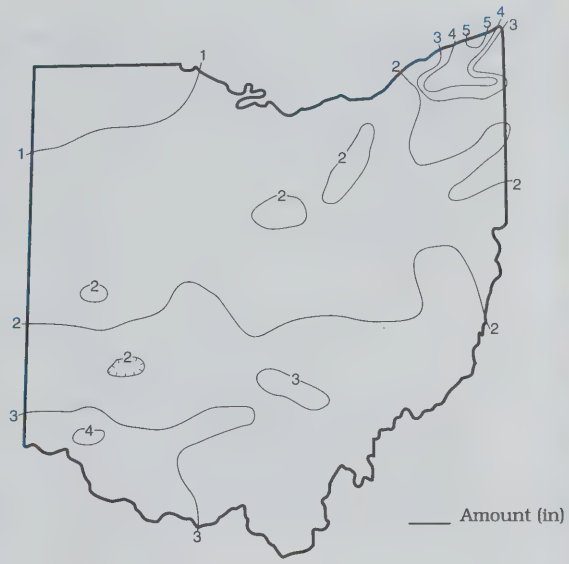
The first twelve days of December were rather dry in most areas of the state with only small amounts of precipitation reported. The remainder of the month was much wetter with precipitation reported on several days, but only two periods had significant amounts of precipitation. The first was during December 12-15 when most areas of the state received around 0.5 inch of precipitation. The second was during December 18-21 when most areas of the state received more than 1 inch of precipitation with some locations approaching 2 inches. Rain changing to freezing rain and heavy snow gave many areas their first winter storm of the season. This storm missed most of the northwestern area of Ohio. Most of the snow that fell during this storm remained on the ground through the holiday season, but began to melt at the end of the year as warmer temperatures and light showers brought in the new year.

Precipitation for the 1996 water year is above normal throughout the state. The state average is 9.15 inches, 1.58 inches above normal. Regional averages range from 11.34 inches, 3.10 inches above normal, for the Northeast Region to 7.78 inches, 0.75 inch above normal, for the Northwest Region. Even with the below normal precipitation during December, the 1996 water year is off to a good start as far as precipitation for ground water supply recharge is concerned.

Precipitation for the 1995 calendar year was above normal throughout most of Ohio but below normal in the northwestern, eastern and southeastern areas of the state. The state average was 39.03 inches, 1.46 inches above normal. Regional averages ranged from 43.57 inches, 3.30 inches above normal, for the Southwest

(continued on back)

PRECIPITATION DECEMBER 1995



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.29 | +0.75 | -2.33 | -2.61 | -7.96 | +0.8 |
| North Central | -0.77 | +1.75 | +1.45 | +3.75 | +0.66 | +1.6 |
| Northeast | -0.08 | +3.10 | +0.61 | +0.80 | +1.76 | +1.7 |
| West Central | -0.70 | +1.74 | +3.52 | +5.02 | -1.89 | +2.5 |
| Central | -0.53 | +1.26 | +1.85 | +4.76 | +0.65 | +2.1 |
| Central Hills | -0.72 | +1.98 | +1.01 | +2.99 | +1.80 | +1.6 |
| Northeast Hills | -0.63 | +1.41 | -2.30 | -2.87 | -1.01 | +0.6 |
| Southwest | +0.05 | +1.48 | +0.94 | +3.30 | -0.64 | +1.5 |
| South Central | -0.16 | +0.54 | -0.60 | -0.29 | +1.68 | +1.0 |
| Southeast | -0.28 | +1.74 | -1.63 | -0.44 | +2.09 | +1.3 |
| State | -0.51 | +1.58 | +0.26 | +1.46 | -0.25 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,635 | 97 | 97 | 85 | 82 |
| Great Miami River at Hamilton | 3,630 | 1,780 | 48 | 118 | 167 | 109 |
| Huron River at Milan | 371 | 98 | 66 | 102 | 85 | 93 |
| Killbuck Creek at Killbuck | 464 | 195 | 52 | 103 | 99 | 88 |
| Little Beaver Creek near East Liverpool | 496 | 284 | 64 | 99 | 89 | 73 |
| Maumee River at Waterville | 6,330 | 1,182 | 22 | 59 | 73 | 74 |
| Muskingum River at McConnsville | 7,422 | 3,961 | 56 | 90 | 96 | 93 |
| Scioto River near Prospect | 567 | 132 | 50 | 193 | 223 | 132 |
| Scioto River at Higby | 5,131 | 2,934 | 64 | 124 | 176 | 124 |
| Stillwater River at Pleasant Hill | 503 | 137 | 34 | 147 | 178 | 98 |

STREAMFLOW during December was below normal throughout the state. Flows in northwestern Ohio were low enough to be considered deficient. Flows during December, contrary to the normal seasonal trend, were less than the flows recorded during November.

Flows at the beginning of December were below normal throughout the state. Generally, flows declined during the first two weeks of the month with the lowest flows for December occurring sometime between December 9-13 in most areas of the state. Flows increased following precipitation at mid-month and again following widespread precipitation during December 18-19. Greatest flows for the month occurred on December 15 in Northern Ohio and during December 1920 in the southern two-thirds of the state. Flows declined during the last ten days of the month and were noticeably below normal at the month's end.

Streamflow during the 1995 calendar year was below normal in many areas of the state, but above normal in some southwestern, central and south-central Ohio drainage basins (see Mean Stream Discharge table, percent of normal past twelve months column). Annual flows in northeastern Ohio were low enough to be considered deficient. Streamflow during January was above normal in most areas of the state with minor flooding reported following snowmelt and precipitation. Below normal precipitation resulted in below normal streamflows during February, March, and April throughout most of Ohio, but some minor flooding occurred in the northwestern and north-central areas of the state during April. Most of Ohio saw noticeably above normal flows during the May through August period. The exception was in northeastern Ohio where flows were consistently below normal throughout this period. Flash floods occurred in the south-central area of Ohio during May and small stream and urban flooding was reported during June and July. The most notable flooding during 1995 occurred during August with western, central and southern Ohio being hardest hit. An unusually dry September reduced flows noticeably statewide, but the remnants of several tropical storms and hurricanes passed through Ohio in early October and streamflows returned to above normal levels after the one-month hiatus. Flows remained above normal during November, but fell to below normal levels during December.

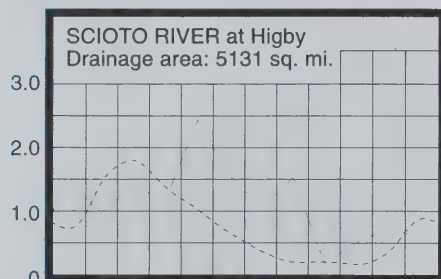
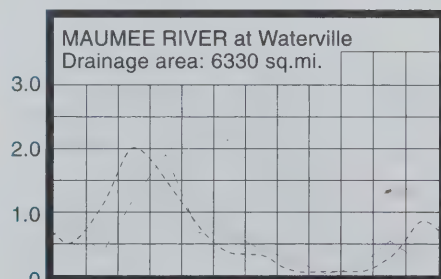
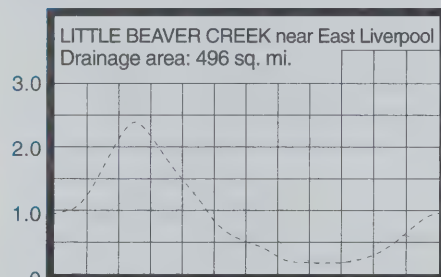
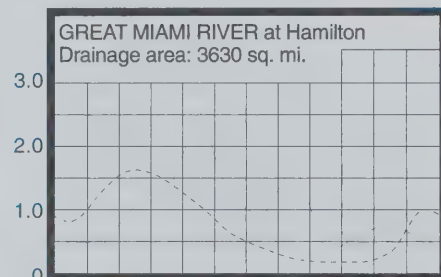
RESERVOIR STORAGE for water supply during December declined slightly in both the Mahoning and Scioto river basins. Storage remained at above normal seasonal levels in both basins.

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 68 percent of rated capacity for water supply compared with 69 percent for last month and 64 percent for December 1994. Month-end storage in the Scioto basin index reservoirs was 88 percent of rated capacity for water supply compared with 90 percent for last month and 58 percent for December 1994. Surface-water supplies are in good condition at the end of the 1995 calendar year.

Surface-water supplies were near or above normal throughout the 1995 calendar year. Some reservoirs in the Scioto River basin were at exceptionally below normal levels at the start of the year, but quickly recovered to above normal levels

MEAN STREAM DISCHARGE

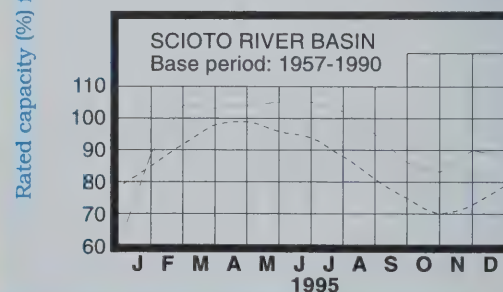
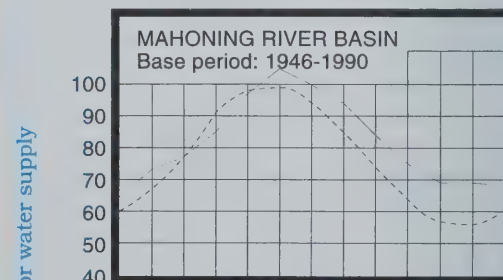
Discharge (cu ft/sec/sq mi)



J F M A M J J A S O N D
1995

Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal

Current

with run-off from snowmelt and precipitation. Adequate, and at times excessive, precipitation during the summer months kept reservoirs levels above normal and also reduced demand for public water supplies.

GROUND WATER LEVELS during December showed mixed responses across the state. Levels in most aquifers were stable or declined slightly during the first half of the month. During the second half of the month, levels in some aquifers, especially shallow unconsolidated aquifers, rose in response to precipitation while levels continued to slowly decline in most deeper aquifers. In any case, net changes during December from November's levels were less than usually observed.

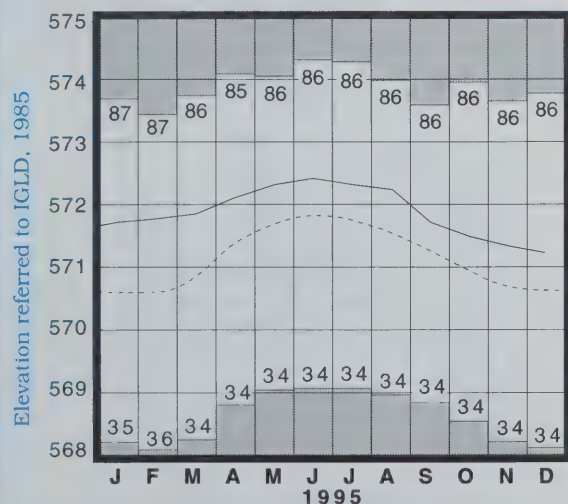
Ground water levels continue to remain below normal in much of the eastern half of the state; however, the prognosis is more optimistic than last year since current levels range from slightly higher to nearly three feet higher than the levels observed a year ago. Hydrologic conditions during the past few months have provided favorable conditions for the start of the 1996 water recharge season. With near normal precipitation and other climatic conditions, the prospect for adequate recharge during the next several months is good.

Ground water storage during the 1995 calendar year improved throughout the state. At the beginning of the year, levels were noticeably below normal in most areas of the state as a result of several unusually dry summer and fall months in 1994. Continued below normal precipitation during the late winter and early spring months in 1995 resulted in limited recharge, and ground water levels remained below normal through May. Adequate, and at times excessive, precipitation during the late spring and early summer months provided much needed recharge and reduced demand on both public and private water supplies. Some areas in the eastern half of the state, especially the northeastern section, received somewhat less rainfall and ground water levels have remained at below normal levels. Coupled with the recent hydrologic conditions and with adequate precipitation during the next several months, recharge should be ample to improve this situation. Generally, ground water supplies are adequate at the end of the 1995 calendar year.

LAKE ERIE level declined seasonally during December. The mean level was 571.23 feet (IGLD-1985), 0.10 foot below last month's mean level and 0.60 foot above normal. This month's level is 0.36 foot lower than the December 1994 level and 2.03 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during December averaged 1.7 inches, 0.9 inch below normal. The entire Great Lakes basin averaged 2.1 inches of precipitation during December, 0.2 inch below normal. For calendar year 1995, the Lake Erie basin averaged 32.6 inches of precipitation, 2.3 inches below normal and the entire Great Lakes basin averaged 33.6 inches, 1.3 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

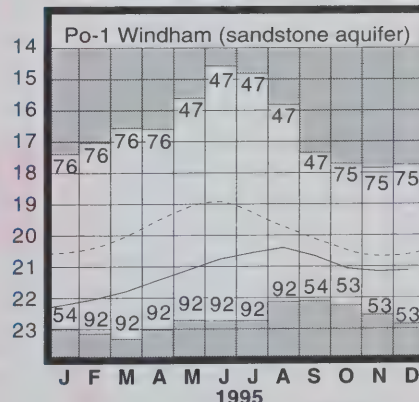
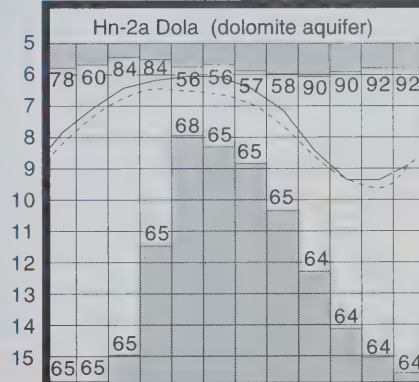
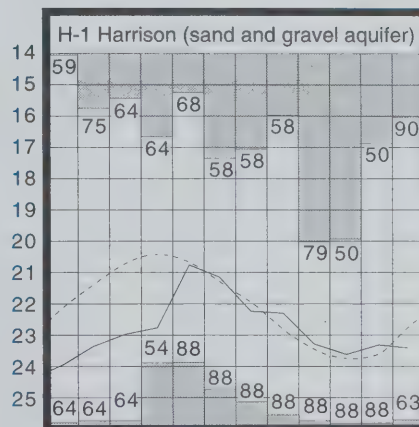
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 18.90 | -2.05 | -0.20 | +2.82 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.58 | +0.58 | +0.25 | +1.90 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.76 | +1.34 | +0.19 | +1.69 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.41 | -0.59 | -0.09 | +1.04 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 8.90 | +0.04 | +0.49 | +0.28 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.14 | -0.53 | +0.03 | +1.19 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 16.10 | -2.82 | -0.12 | +0.11 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current ———

(continued from front page)

Region to 31.21 inches, 2.61 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Piqua (Miami County) reported the greatest amount of precipitation during the year, 55.57 inches. Hicksville (Defiance County) reported the least amount, 26.64 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1995 calendar year appear below.

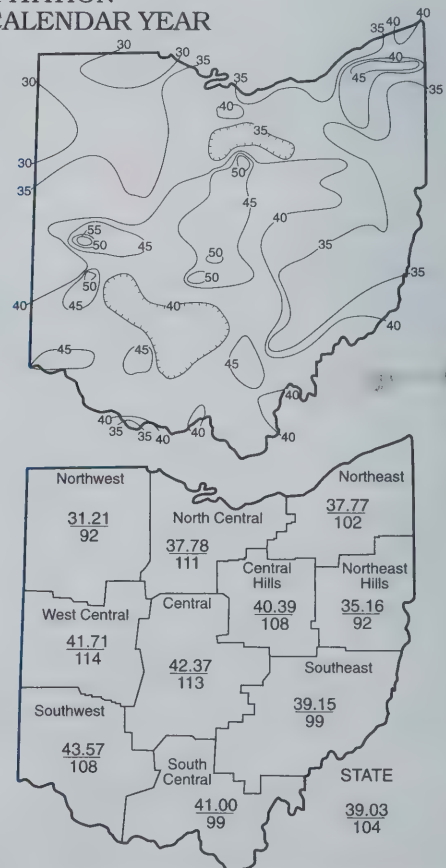
The 1995 calendar year started off with above normal precipitation during January in all but the west-central and southwestern areas of the state, but returned to unusually below normal levels during February and March, a trend that started during the autumn months of 1994. Precipitation during April was above normal in the central and western areas of the state, but continued to be below normal in the eastern and south-central areas. Precipitation was noticeably above normal in May, ranking as the eighth wettest on record, and also in June, which caused some delays in the planting of agricultural crops. Many areas of the state had below normal precipitation during July, but the central, west-central and northeastern areas had above normal precipitation. August precipitation was above normal in the western two-thirds of Ohio, but continued to be below normal in the eastern one-third. The entire state was unusually dry during September which ranked as the seventh driest on record. Conditions changed abruptly during October as the remnants of tropical storms and hurricanes passed through the state resulting in October 1995 being the eleventh wettest on record. November precipitation was above normal in the northern half of the state, but below normal in the southern half. The year ended with below normal precipitation throughout most of Ohio during December. Water supplies and agricultural crops fared well in most areas of the state during 1995 even with the fluctuating precipitation conditions.

SUMMARY

Precipitation during December was below normal throughout most of Ohio. Streamflow was below normal statewide. Reservoir storage decreased slightly. Ground water levels showed mixed responses and remained at below normal levels in the eastern half of the state. Lake Erie level declined 0.10 foot and was 0.60 foot above the long-term December average.

Precipitation for the 1995 calendar year was above normal in many areas of the state, but below normal in northwestern, eastern and southeastern Ohio. Streamflow was below normal in most areas, but above normal in central, south-central and southwestern Ohio. Reservoir storage was at above normal levels throughout most of the year. Ground water levels improved during the year, but remained at below normal levels at the end of the year in the eastern half of the state. Lake Erie was above its long-term average level throughout the year.

PRECIPITATION 1995 CALENDAR YEAR



ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department of Natural Resources

OHIO

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DIVISION OF WATER
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Governor

Donald C. Anderson
Director

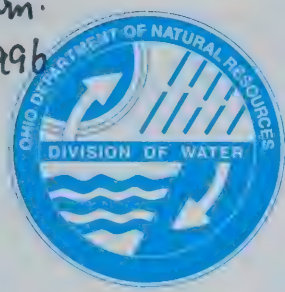
Michele Willis
Chief

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R1-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

January 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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FE 27 '96

PRECIPITATION during January was above normal throughout most of the state with only a few areas in north-central and northwestern Ohio having below normal precipitation. The state average was 3.77 inches, 1.01 inches above normal. Regional averages ranged from 5.11 inches, 1.74 inches above normal, for the South Central Region to 2.40 inches, 0.10 inch above normal, for the North Central Region. McArthur (Vinton County) reported the greatest amount of precipitation for the month, 6.47 inches; Enterprise (Hocking County) and Hillsboro (Highland County) also reported more than 6 inches of precipitation during January. Sandusky (Erie County) reported the least amount of January precipitation, only 1.27 inches.

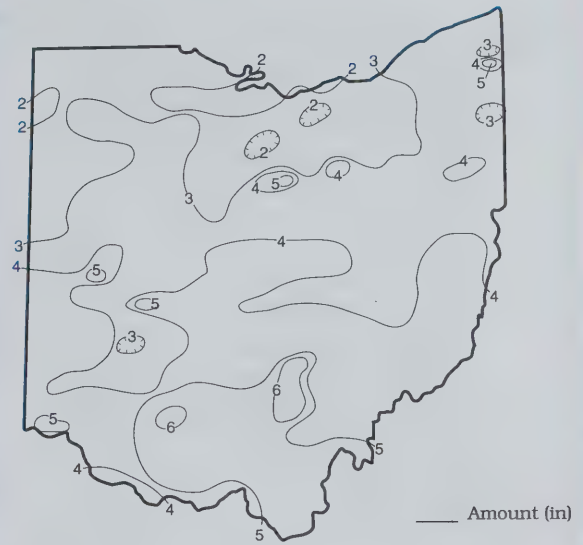
Precipitation during January generally fell as snow during the first half of the month and as rain during the second half. Total snow amounts for most areas of the state were impressive, generally ranging from 12 to 30 inches. There was measurable precipitation on many days during the month, but three or four storms produced most of the precipitation at many locations. The first was during January 2-3 when snow and a rain/snow mix totaled 0.5 to 1 inch in many areas of the state. The next notable storm was during January 6-7 when heavy snow and near blizzard conditions swept across the southern, central and eastern areas of the state. Snow amounts of more than 1 foot were common with drifting causing additional problems. Most of the snow that fell during the first half of January remained on the ground at mid-month.

The "January Thaw" started after the middle of the month with temperatures soaring into the 60's by January 18. Storms arrived with the warmer temperatures. Steady rain during January 18-19 averaged about 1 inch statewide and combined with rapid snowmelt to produce moderate flooding in low-lying areas. Runoff from Ohio and the surrounding states in the upper Ohio River basin caused extensive flooding in eastern and southern counties along the Ohio River. Thirteen counties have been declared major disaster areas (see Notes And Comments, "Thirteen Ohio Counties Declared Disaster Areas"). More heavy rain fell during January 23-24 in many areas of the state with amounts ranging from 0.5 inch in northern Ohio to more than 2 inches at some locations in southern Ohio. The month ended with colder temperatures and light snow returning to the state.

Precipitation for the 1996 water year is above normal throughout Ohio. The state average is 12.92 inches, 2.59 inches above normal. Regional averages range from 14.73 inches, 3.90 inches above normal, for the Northeast Region to 10.39 inches, 1.18 inches above normal, for the Northwest Region. The above normal precipitation so far during the 1996 water year's recharge period has been beneficial for water supplies.

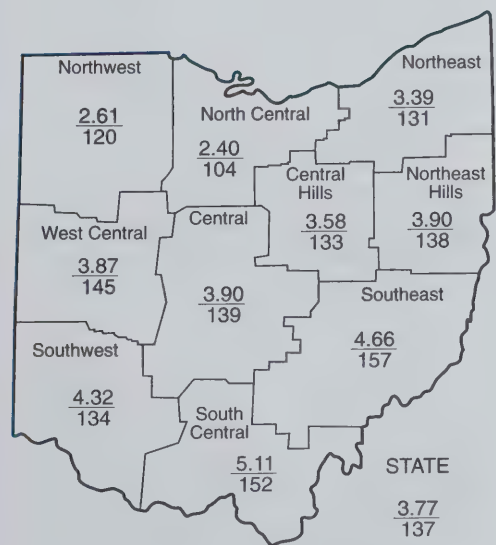
The 1996 calendar year is off to a good start as far as precipitation is concerned. Although favorable for water supplies, the climatic conditions during January caused numerous problems including hazardous driving conditions, travel delays, business and school closings, property damage, and flooding.

PRECIPITATION JANUARY 1996



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.43 | -0.61 | -0.25 | -2.82 | -7.78 | +1.0 |
| North Central | +0.10 | +0.03 | +0.98 | +1.81 | +0.33 | +1.5 |
| Northeast | +0.80 | +1.59 | +0.86 | +0.07 | +1.69 | +1.7 |
| West Central | +1.20 | +0.74 | +3.64 | +6.43 | -0.94 | +2.3 |
| Central | +1.09 | +0.32 | +2.75 | +4.42 | +1.02 | +2.0 |
| Central Hills | +0.88 | +0.32 | +2.41 | +1.53 | +1.99 | +1.5 |
| Northeast Hills | +1.07 | +0.53 | +0.52 | -2.31 | -1.23 | +0.9 |
| Southwest | +1.09 | +0.47 | +2.83 | +4.66 | +0.17 | +1.5 |
| South Central | +1.74 | +0.74 | +2.65 | +0.04 | +2.43 | +1.6 |
| Southeast | +1.69 | +1.34 | +1.90 | -0.07 | +1.93 | +1.5 |
| State | +1.01 | +0.55 | +1.83 | +1.39 | -0.01 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|-----------|
| | | | | 3 Mos. | 6 Mos. | * 12 Mos. |
| Grand River near Painesville | 685 | 3,358 | 319 | 164 | 135 | 91 |
| Great Miami River at Hamilton | 3,630 | 10,552 | 356 | 138 | 177 | 131 |
| Huron River at Milan | 371 | 539 | 152 | 113 | 107 | 93 |
| Killbuck Creek at Killbuck | 464 | 1,213 | 322 | 161 | 161 | 96 |
| Little Beaver Creek near East Liverpool | 496 | 1,178 | 238 | 139 | 132 | 84 |
| Maumee River at Waterville | 6,330 | 13,300 | 422 | 133 | 110 | 87 |
| Muskingum River at McConnelsville | 7,422 | 15,200 | 192 | 122 | 130 | 95 |
| Scioto River near Prospect | 567 | 1,831 | 542 | 227 | 262 | 156 |
| Scioto River at Higby | 5,131 | 14,271 | 384 | 174 | 206 | 137 |
| Stillwater River at Pleasant Hill | 503 | 1,799 | 446 | 437 | 331 | 131 |

STREAMFLOW during January was noticeably above normal throughout Ohio. Flows were high enough to be considered excessive statewide. January flows were markedly greater than the flows recorded during December.

Flows at the beginning of the month were below normal throughout the state and were the lowest observed during January in most areas. Generally, flows increased slightly during the first week of the month and then declined until the middle of the month as most of the precipitation during this period fell as snow and remained frozen on the ground. Flows started to increase after mid-month as the snow started to melt, then increased noticeably after January 18 due to the rain and rapid snowmelt. The greatest flows for the month were observed during January 19-21

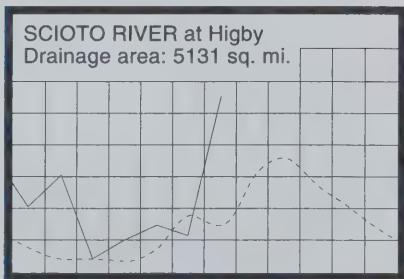
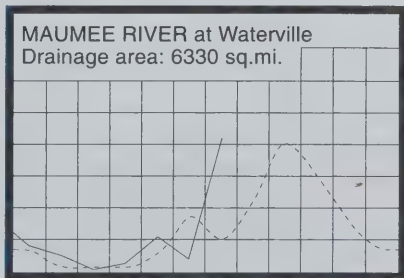
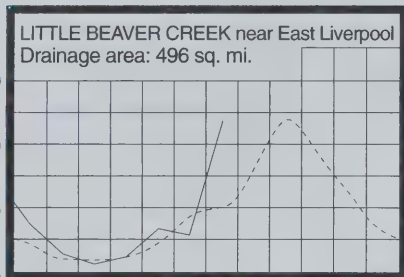
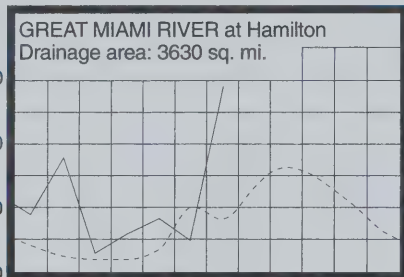
throughout the state. Minor flooding of low-lying areas was common; however, areas along the Ohio River were not as fortunate. Snowmelt and precipitation from the upper Ohio River drainage basin contributed significant amounts of runoff and river levels rose well above flood stage (see Notes and Comments, "Thirteen Ohio Counties Declared Disaster Areas"). Flows remained above normal statewide through the end of the month.

RESERVOIR STORAGE for water supply during January increased in both the Mahoning and Scioto river basins. Storage remained at above normal seasonal levels in both basins.

Reservoir storage at the end of January in the Mahoning basin index reservoirs was 93 percent of rated capacity for water supply compared with 68 percent for last month and 73 percent for January 1995. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with 88 percent for last month and 89 percent for January 1995.

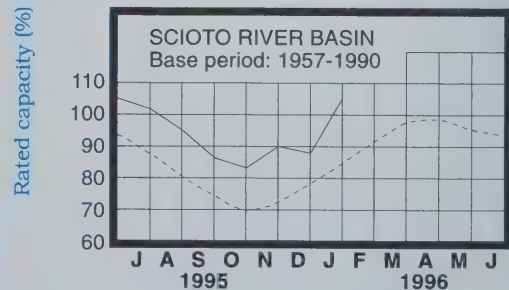
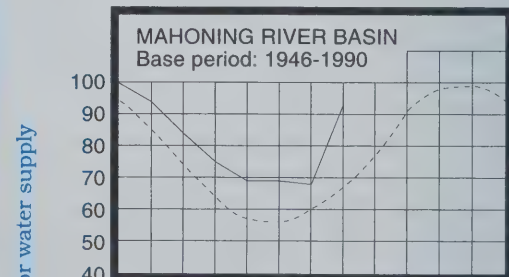
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



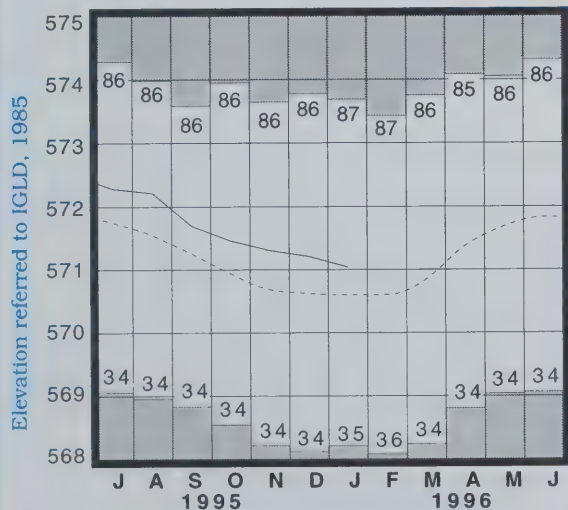
Normal - - - - - Current ———

GROUND WATER LEVELS during January showed net improvement throughout the state. Net changes during January from December's levels ranged from the same to twice that usually observed. Generally, levels were stable during the first half of the month and then rose during the second half, responding to recharge from precipitation and snowmelt. Levels in shallow aquifers, especially shallow unconsolidated aquifers, rose rapidly after mid-month while levels in deeper aquifers rose steadily during the second half of the month.

Ground water levels continue to remain below normal in many areas in the eastern half of the state, but are in a more favorable position than last year. Hydrologic conditions during the past several months have been positive for the improvement in ground water storage as indicated by the fact that current levels range from about the same to more than three feet higher than the levels observed a year ago. The recharge to ground water storage received during January helps to reinforce an optimistic outlook for adequate ground water supplies throughout the 1996 water year. Continued near normal precipitation and other hydrologic conditions during the next several months will be needed to provide sustained improvement in ground water storage throughout the remainder of the recharge period.

LAKE ERIE level declined during January. The mean level was 571.06 feet (IGLD-1985), 0.17 foot below last month's mean level and 0.46 foot above normal. This month's level is 0.66 foot lower than the January 1995 level and 1.86 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

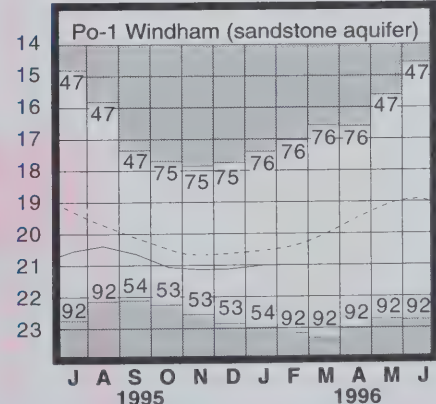
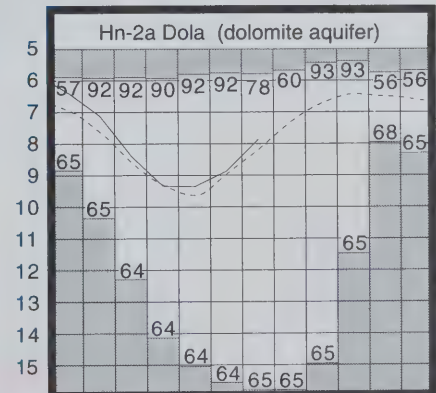
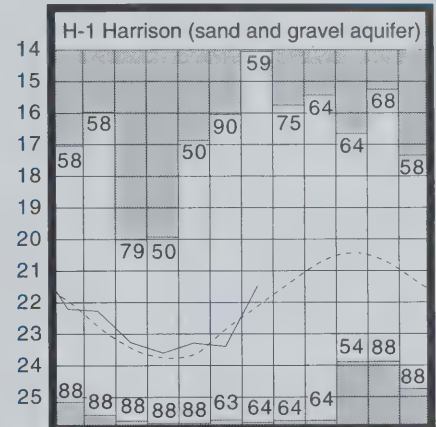
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.51 | -1.96 | +1.39 | +3.33 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.01 | +0.43 | +0.57 | +1.22 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.41 | +1.20 | +0.35 | +1.61 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.51 | +0.62 | +1.90 | +2.42 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.90 | +0.30 | +1.00 | -0.04 |
| Po-1 | Windham, Portage Co. | Sandstone | 21.01 | -0.46 | +0.13 | +1.20 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.34 | -2.41 | +0.76 | +0.39 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was above normal throughout most of the state. Streamflow was excessive statewide with extensive flooding along the Ohio River resulting in a federal disaster declaration for thirteen counties. Reservoir storage increased and continues to remain at seasonally above normal levels. Ground water levels rose during the second half of the month and are noticeably higher than they were a year ago. Lake Erie level declined 0.17 foot and was 0.46 foot above the long-term January average.

NOTES AND COMMENTS

THIRTEEN OHIO COUNTIES DECLARED DISASTER AREAS

Heavy snow fell throughout the upper Ohio River basin during early January. In some areas more than two feet were on the ground by the middle of the month. Thawing temperatures began to move into the area at mid-month. Within a few days unseasonably warm temperatures were caused rapid snowmelt and moderately heavy rain fell over much of the area. These conditions combined to cause extensive flooding along the Ohio River with ten Ohio counties being severely impacted. At the request of Governor Voinovich, President Clinton declared Adams, Belmont, Brown, Clermont, Columbiana, Gallia, Hamilton, Jefferson, Lawrence, Meigs, Monroe, Scioto and Washington counties to be major disaster areas. This declaration enables affected residents and local governments to apply for various federal disaster relief programs.

Initial damage reports indicate that in Ohio more than 2,000 homes and businesses were affected by the flooding. Early estimates of damage to private and public property total more than \$16 million. The Ohio Department of Natural Resources is one of the state agencies that actively assists the Ohio Emergency Management Agency with emergency response activities and coordination. Staff from the Division of Water provided essential information and advice.

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Fairfield County

by James J. Schmidt

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

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Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

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|----------------------|---------|
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| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
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U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service.



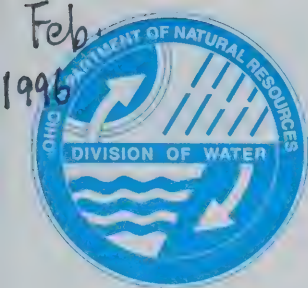
DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

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Director

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Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

February 1996

RI-186

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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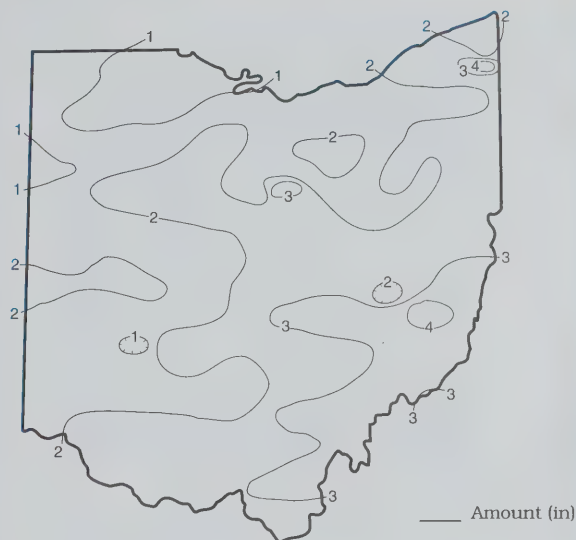
PRECIPITATION during February was generally above normal in the eastern half of Ohio and below normal in the western half. The state average was 2.15 inches, 0.09 inch below normal. Regional averages ranged from 3.17 inches, 0.68 inch above normal, for the Southeast Region to 1.18 inches, 0.66 inch below normal, for the Northwest Region. Andover (Ashtabula County) reported the greatest amount of precipitation for the month, 4.96 inches; Barnsville (Belmont County) was the only other location to report more than 4 inches of precipitation during February. Van Wert (Van Wert County) reported the least amount of precipitation in February, only 0.36 inch. Several other locations in the northwestern area of the state also reported less than 1 inch of precipitation.

Most of the precipitation during February fell as rain during the last ten days of the month. Prior to this, the precipitation fell as light snow or scattered rain showers. Most areas of the state had received much less than 0.5 inch of precipitation by the middle of the month with only some areas in southeastern Ohio exceeding this amount. Warmer air moved into the state after February 18 and brought rain showers and thunderstorms with it. Rain during February 19-20 averaged about 0.5 inch in all but the northwestern area of the state. The most widespread precipitation during the month fell during February 26-28 with amounts ranging from 0.5 inch to more than 1.5 inches. Rivers and streams ran at or near bank-full after these rains, but no serious flooding was reported.

Precipitation for the 1996 calendar year is above normal throughout most of Ohio, but slightly below normal in the Northwest and North Central regions. The state average is 5.92 inches, 0.92 inch above normal. Regional averages range from 7.83 inches, 2.37 inches above normal, for the Southeast Region to 3.79 inches, 0.23 inch below normal, for the Northwest Region.

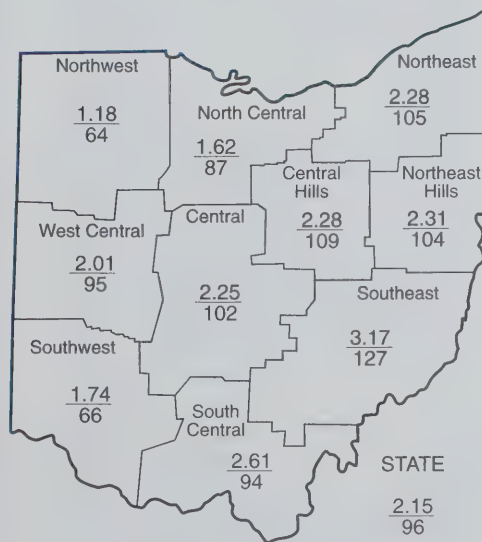
Precipitation for the 1996 water year is above normal throughout the state. The state average is 15.06 inches, 2.49 inches above normal. Regional averages range from 17.26 inches, 4.11 inches above normal, for the Southeast Region to 11.57 inches, 0.52 inch above normal, for the Northwest Region. The excess precipitation during the first five months of the 1996 water year has been beneficial for water supplies, especially ground water supplies. Near normal precipitation and other climatic conditions during the next few months, the remainder of the ground water-supply recharge season, will help to maintain the favorable conditions for continued improvement in ground water storage.

PRECIPITATION FEBRUARY 1996



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.66 | -1.52 | -1.26 | -2.42 | -7.80 | +0.7 |
| North Central | -0.25 | -0.92 | -0.16 | +2.56 | +0.75 | +1.4 |
| Northeast | +0.11 | +0.83 | +2.14 | +0.67 | +2.61 | +2.2 |
| West Central | -0.10 | +0.40 | +1.14 | +7.47 | -0.30 | +2.5 |
| Central | +0.04 | +0.60 | +0.70 | +5.30 | +1.66 | +2.3 |
| Central Hills | +0.19 | +0.35 | +1.09 | +2.65 | +2.74 | +1.9 |
| Northeast Hills | +0.08 | +0.52 | +1.04 | -1.59 | -0.89 | +1.1 |
| Southwest | -0.88 | +0.26 | +0.20 | +5.02 | +0.08 | +1.0 |
| South Central | -0.17 | +1.41 | +0.89 | +0.83 | +1.18 | +1.4 |
| Southeast | +0.68 | +2.09 | +2.98 | +1.23 | +2.62 | +1.9 |
| State | -0.09 | +0.41 | +0.88 | +2.19 | +0.30 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,167 | 110 | 146 | 135 | 100 |
| Great Miami River at Hamilton | 3,630 | 4,064 | 84 | 136 | 129 | 137 |
| Huron River at Milan | 371 | 659 | 141 | 100 | 109 | 102 |
| Killbuck Creek at Killbuck | 464 | 665 | 95 | 131 | 124 | 102 |
| Little Beaver Creek near East Liverpool | 496 | 1,180 | 140 | 140 | 126 | 95 |
| Maumee River at Waterville | 6,330 | 3,083 | 44 | 98 | 90 | 88 |
| Muskingum River at McConnelsville | 7,422 | 14,110 | 116 | 119 | 112 | 102 |
| Scioto River near Prospect | 567 | 656 | 98 | 163 | 160 | 162 |
| Scioto River at Higby | 5,131 | 8,473 | 112 | 148 | 143 | 142 |
| Stillwater River at Pleasant Hill | 503 | 616 | 111 | 164 | 138 | 137 |

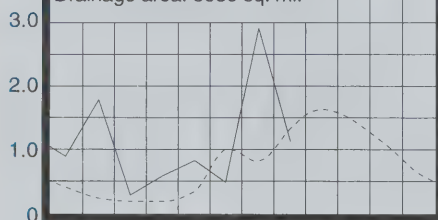
STREAMFLOW during February was above normal throughout most of Ohio but below normal in some drainage basins in the southwestern, northwestern and north-central areas of the state. Streamflow during February was less than the noticeably high flows observed during January in most areas of the state.

Flows at the beginning of the month were above normal in the eastern half of the state but had fallen to below normal in the western half. Generally, flows slowly declined through mid-month responding to the lack of precipitation and frozen conditions. Lowest flows for the month were recorded on or about February 19 in most drainage basins. Flows increased after this date following scattered rain showers and warmer temperatures. Flows increased noticeably a few days before the end of February following the month's heaviest and most widespread precipitation. Greatest flows for the month occurred during February 28-29. Flows were noticeably above normal throughout the state at the end of the month.

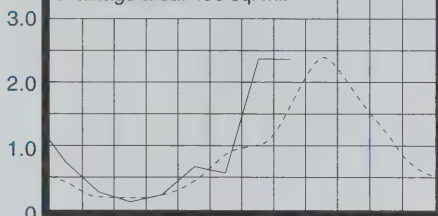
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)

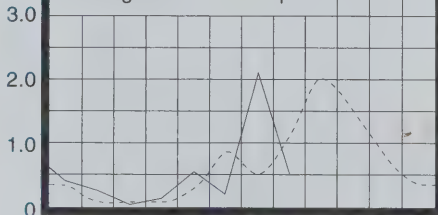
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



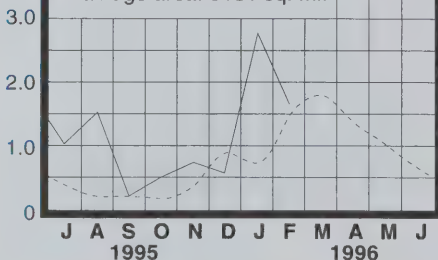
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



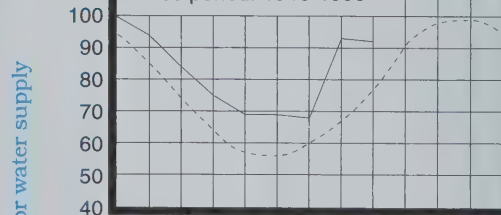
Base period for all streams: 1961-1990

RESERVOIR STORAGE for water supply during February declined slightly in the Mahoning River basin and was unchanged in the Scioto River basin. Storage remained above normal in both basins.

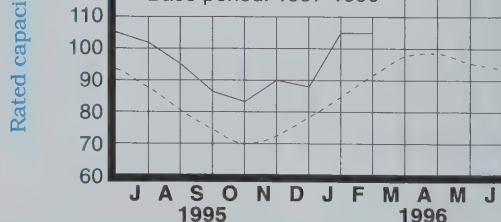
Reservoir storage at the end of February in the Mahoning basin index reservoirs was 92 percent of rated capacity for water supply compared with 93 percent for last month and 77 percent for February 1995. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with the same for last month and 104 percent for February 1995.

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



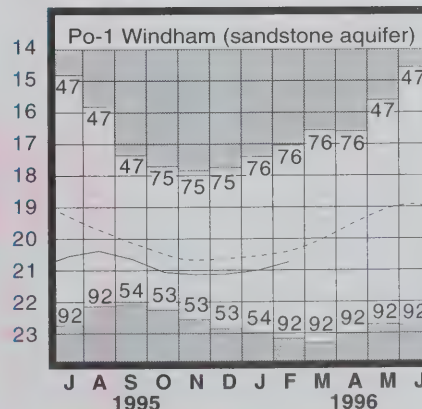
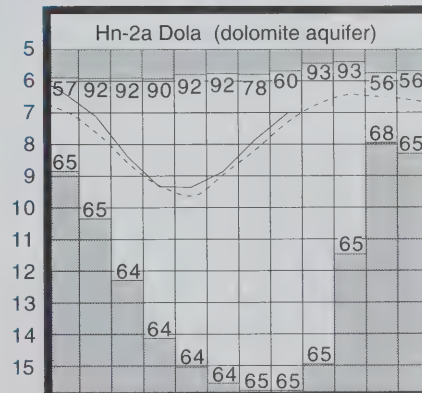
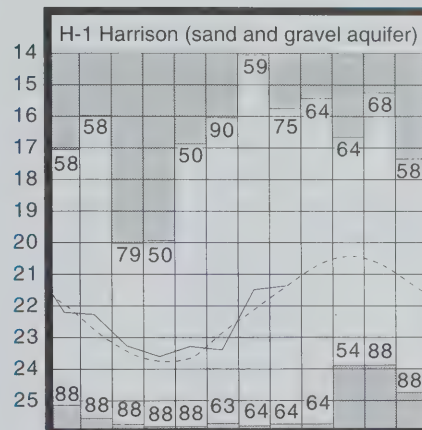
Normal - - - - Current ———

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

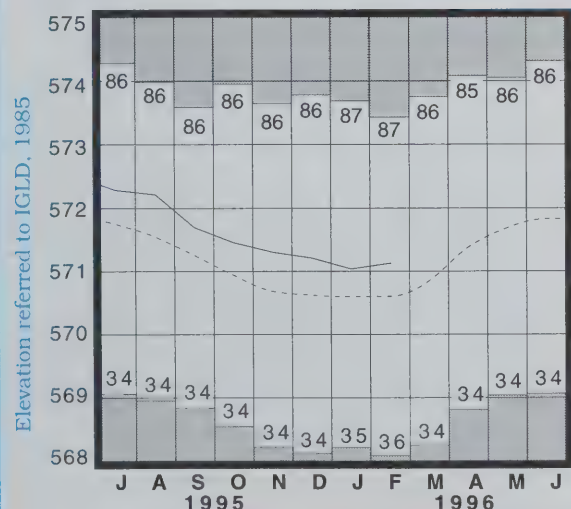
| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.69 | -0.21 | +2.82 | +2.79 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 6.95 | +0.13 | +0.06 | +0.56 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.84 | +1.25 | +0.57 | +1.83 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.40 | 0.00 | +0.11 | +1.95 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.03 | +0.31 | +0.87 | +0.07 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.76 | -0.36 | +0.25 | +1.29 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.59 | -1.45 | +1.75 | +1.44 |

GROUND-WATER LEVELS



Water level (ft below land surface)

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was generally above normal in the eastern half of the state and below normal in the western half. Streamflow was above normal in most areas of the state, but below normal in some southwestern, northwestern and north-central Ohio drainage basins. Reservoir storage was stable during the month and continued to remain at above normal levels. Ground water levels showed net improvement and were noticeably higher than they were a year ago. Lake Erie level rose 0.07 foot and was 0.53 foot above the long-term February level.

NOTES AND COMMENTS

WMAO ANNUAL SPRING MEETING

The Water Management Association of Ohio (WMAO) will hold its annual spring meeting on May 16, 1996 at the Akron Hilton. The meeting is being co-sponsored by the Ohio Section of the American Water Resources Association (AWRA) and the National Aeronautics and Space Administration (NASA). The theme of this conference will be local, regional and state applications of geographic information systems (GIS) in water related issues. The registration cost is \$35. Contact Ralph Haefner with the U. S. Geological Survey, Water Resources Division in Columbus at the address listed below for registration information.

Oral presentations for both the morning and afternoon sessions have been selected; however, space is available for poster presentations. Poster presentations will require submission of a one page abstract by April 15, 1996. Abstracts can be sent to:

Ralph J. Haefner
U. S. Geological Survey, WRD
975 West Third Avenue
Columbus, Ohio 43212
Phone: (614) 469-5553 ext. 146
e-mail: rhaefner@usgs.gov

At the WMAO 1995 Annual Fall Conference, two new professional associations focusing on water safety issues in Ohio were organized. They are the Ohio Floodplain Management Association (OFMA) and the Ohio Dam Safety Organization (ODSO). Both have become divisions within WMAO, but each maintains their own organizational structure and procedures. This affiliation with WMAO benefits both OFMA and ODSO by allowing them to draw on WMAO's administrative support.

ODSO's mission is to promote dam safety in the state of Ohio by establishing a partnership between dam owners, operators, engineers and regulators. The organization provides a forum for education and discussion on dam safety related issues. It also provides a voice for all concerned in the formation and implementation of dam safety policy in the state of Ohio. An ODSO spring meeting will be held in conjunction with the WMAO spring meeting. The meeting will address an update of ODSO's activities, funding of small dam repairs, and instrumentation and monitoring of dams with applications to GIS. An ODSO logo contest will also be launched. For more information about ODSO, call Peter Soltys at (513) 631-8300.

OFMA's mission is to promote the common interest in floodplain management, enhance cooperation between various private, local, state and federal agencies, and to encourage and ensure effective, new and innovative approaches to managing Ohio's floodplains. The association provides a forum to facilitate the cooperation and exchange of information among individuals and government entities and to promote public awareness and professional development in floodplain management through educational and professional seminars. The association also will provide an opportunity to discuss research and legislation pertinent to the effective implementation of floodplain management regulations. OFMA will host several group discussions on the use of GIS in floodplain management at the WMAO spring meeting. For additional information about OFMA, call Jerry Brems, OFMA chair at (614) 349-6555.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources

OHIO



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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Mar.
1996

RI-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

March 1996

Compiled By David H. Cashell
Hydrologist
Water Invent

AP 24 '96

ILLINOIS STATE WATER SURVEY LIBRARY COPY

PRECIPITATION during March was generally below normal in the northern two-thirds of Ohio and above normal in the southern one-third. The state average was 3.15 inches, 0.23 inch below normal. Regional averages ranged from 4.53 inches, 0.91 inch above normal, for the Southeast Region to 2.26 inches, 1.00 inch below normal, for the West Central Region. Stonelick State Park (Clermont County) reported the greatest amount of precipitation for the month, 6.30 inches; Fernbank (Hamilton County) reported 6.25 inches, the only other location reporting more than six inches of March precipitation. Ashtabula (Ashtabula County) reported the least amount of precipitation during March, 1.10 inches.

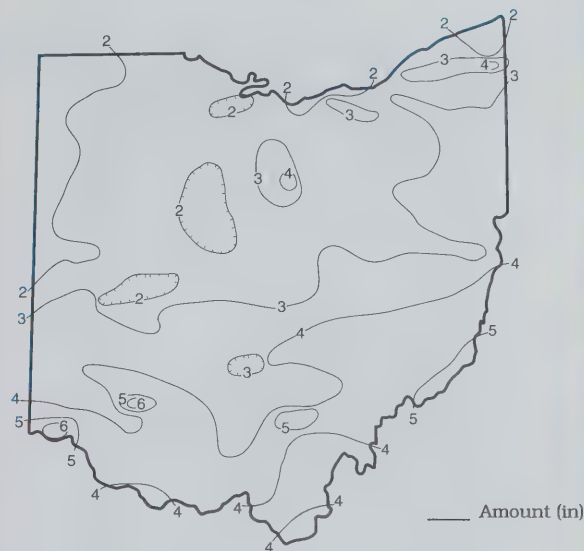
Precipitation during March fell as both rain and snow. Many areas had above normal snowfall for the month. Some areas of the state are approaching record or near-record snow totals for the winter season. Chardon (Geauga County) reported 24.5 inches of snow in March, about 7 inches above normal. Chardon has reported more than 146 inches of snow for the season, about 44 inches above normal, and about 17 inches short of its record established during the winter season of 1959-60.

Precipitation fell during every week of the month. Snow and rain fell during March 5-7 with most areas receiving between 0.5 and 1 inch of precipitation, but some areas reporting in excess of 1.5 inches. Scattered storms crossed the state during March 14-17 with some areas receiving around 0.5 inch of precipitation. The heaviest storms occurred during March 19-22. Many areas of the state received between 1 and 2 inches of rain during March 19-20 and then several inches of snow during March 21-22. Scattered showers remained throughout the state during March 25-31, but were light in most areas of the state.

Precipitation for the 1996 calendar year is above normal throughout most of Ohio, but slightly below normal in the Northwest and North Central regions. The state average is 9.07 inches, 0.69 inch above normal. Regional averages range from 12.36 inches, 3.28 inches above normal, for the Southeast Region to 6.09 inches, 0.80 inch below normal, for the Northwest Region (see Precipitation table, departure from normal, past 3 months column).

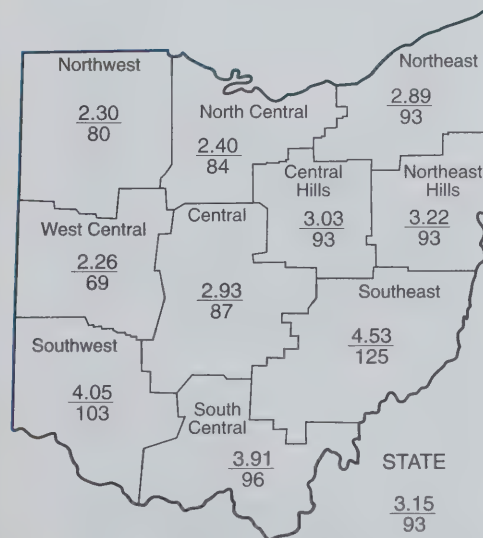
Precipitation for the first half of the 1996 water year is above normal throughout most of the state, but slightly below normal in the Northwest Region. The state average is 18.22 inches, 2.27 inches above normal. Regional averages range from 21.79 inches, 5.02 inches above normal, for the Southeast Region to 13.87 inches, 0.05 inch below normal, for the Northwest Region (see Precipitation table, departure from normal, past 6 months column). Precipitation during the 1996 water year recharge season has been beneficial for both surface and ground water supplies.

PRECIPITATION MARCH 1996



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.57 | -0.80 | -0.05 | -1.80 | -6.91 | +0.2 |
| North Central | -0.46 | -0.61 | +1.14 | +3.18 | +1.63 | +1.1 |
| Northeast | -0.22 | +0.69 | +3.79 | +1.92 | +2.56 | +2.2 |
| West Central | -1.00 | +0.10 | +1.84 | +7.70 | +0.69 | +2.2 |
| Central | -0.44 | +0.69 | +1.95 | +6.67 | +2.50 | +2.0 |
| Central Hills | -0.23 | +0.84 | +2.82 | +4.17 | +3.31 | +1.7 |
| Northeast Hills | -0.23 | +0.92 | +2.33 | 0.00 | -2.00 | +0.9 |
| Southwest | +0.13 | +0.34 | +1.82 | +6.87 | +2.02 | +1.5 |
| South Central | -0.18 | +1.39 | +1.93 | +2.84 | -0.61 | +1.8 |
| Southeast | +0.91 | +3.28 | +5.02 | +4.03 | +2.78 | +2.1 |
| State | -0.23 | +0.69 | +2.27 | +3.57 | +0.63 | |



Average (in)
Percent of normal

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,949 | 102 | 143 | 132 | 104 |
| Great Miami River at Hamilton | 3,630 | 6,655 | 112 | 137 | 123 | 144 |
| Huron River at Milan | 371 | 900 | 129 | 124 | 123 | 116 |
| Killbuck Creek at Killbuck | 464 | 1,091 | 116 | 159 | 152 | 113 |
| Little Beaver Creek near East Liverpool | 496 | 1,276 | 108 | 147 | 139 | 105 |
| Maumee River at Waterville | 6,330 | 8,152 | 64 | 101 | 93 | 88 |
| Muskingum River at McConnelsville | 7,422 | 20,200 | 125 | 143 | 129 | 112 |
| Scioto River near Prospect | 567 | 1,034 | 106 | 153 | 139 | 165 |
| Scioto River at Higby | 5,131 | 12,792 | 139 | 146 | 140 | 152 |
| Stillwater River at Pleasant Hill | 503 | 752 | 91 | 140 | 125 | 142 |

STREAMFLOW during March was above normal throughout most of Ohio, but below normal in the western and northwestern areas of the state. Flows during March increased seasonally from the flows observed during February in most drainage basins.

Flows at the beginning of March were noticeably above normal throughout most of the state. Generally, flows declined during the first few days of the month, increased following precipitation during March 5-7, and then declined through the middle of the month. Although a few drainage basins had slightly lower flows at the end of the month, lowest flows for March generally progressed from west to east across the state starting on March 12 in western Ohio and continuing through March 18

in eastern Ohio. Flows increased noticeably following widespread precipitation during March 19-22. Greatest flows for the month were observed during March 20-25 following this precipitation. Flows declined through the end of the month following these peak flows and were below normal at the month's end.

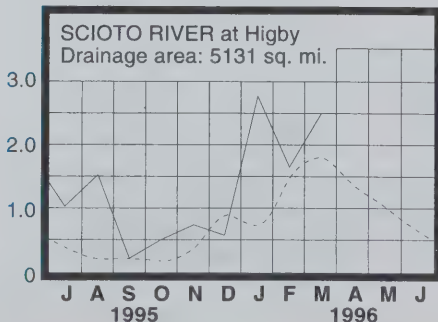
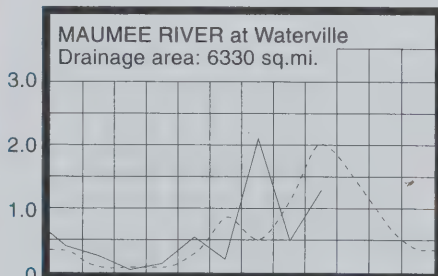
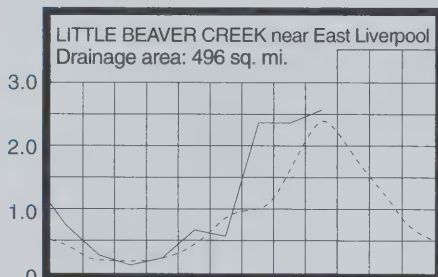
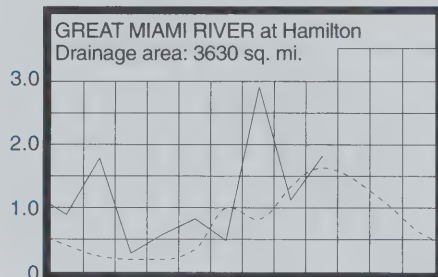
RESERVOIR STORAGE for water supply during March increased in both the Mahoning and Scioto river basins. Storage continued to remain above normal in both basins.

Reservoir storage at the end of March in the Mahoning basin index reservoirs was 98 percent of rated capacity for water supply compared with 92 percent for last month and 85 percent for March 1995. Month-end storage in the Scioto basin index reservoirs was 106 percent of rated capacity for water supply compared with 105 percent for last month and 103 percent for March 1995.

Surface water supplies are in excellent condition throughout the state. Both on- and off-stream water-supply reservoirs are at or near capacity. Recreational reservoirs will soon begin filling to summer pool. The first half of the 1996 water year has been favorable for surface-water resources throughout the state.

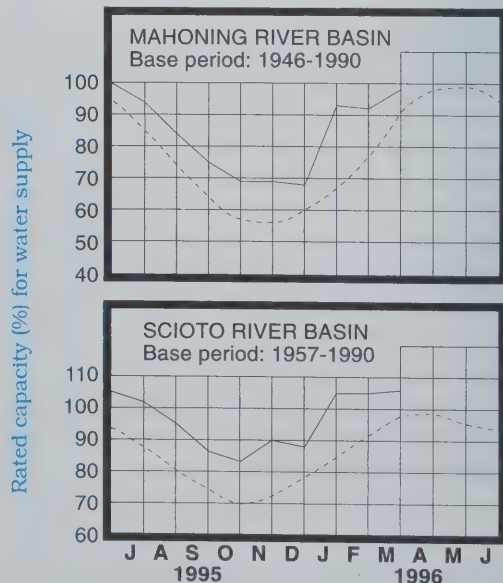
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



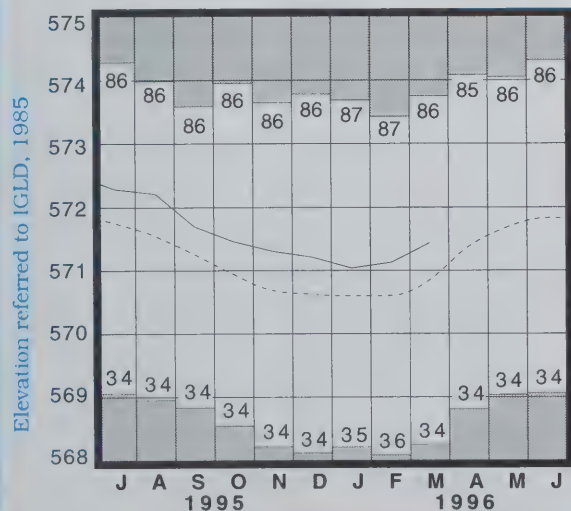
GROUND WATER LEVELS during March showed positive improvement from last month's levels throughout the state. Net changes during March from last month's levels were less than usually observed as a result of the below normal precipitation in many areas of the state. Generally, levels were stable during the first half of the month and then rose sharply during the second half following the month's greatest precipitation. All aquifers seemed to respond in a similar fashion, but deeper aquifers showed a much more subdued response.

The first half of the 1996 water year has been beneficial for ground-water supplies as indicated by the fact that current levels are noticeably higher than the levels observed a year ago. Although some aquifers, especially in the eastern half of the state, continue to have below normal levels, current soil and climatic conditions favor continued improvement in ground water recharge. The potential for recharge exists for the next month or two in most aquifers, and with near normal climatic conditions, additional recharge can be expected. The Ohio Agricultural Statistics Service reports that (as of early April) soil moisture was rated as being adequate in 43 percent of the state and as being surplus in 57 percent of the state.

LAKE ERIE level rose seasonally during March. The mean level was 571.46 feet (IGLD-1985), 0.33 foot above last month's mean level and 0.59 foot above normal. This month's level is 0.39 foot lower than the March 1995 level and 2.26 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during March averaged 2.2 inches, 0.6 inch below normal. The entire Great Lakes basin averaged 1.5 inches of precipitation during March, 0.7 inch below normal. For calendar year 1996 through March, the Lake Erie basin has averaged 6.3 inches of precipitation, 1.0 inch below normal, and the entire Great Lakes basin has averaged 6.6 inches, 0.5 inch above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

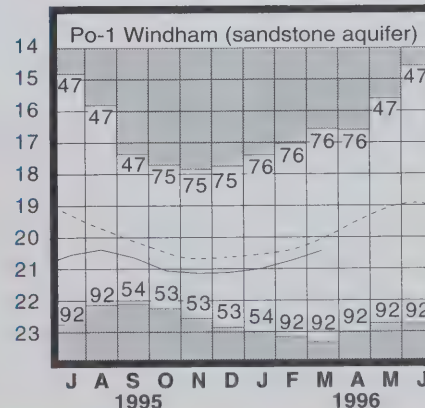
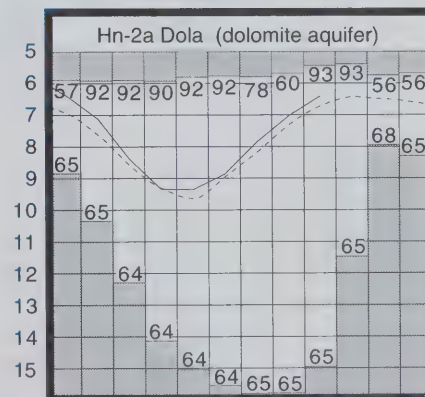
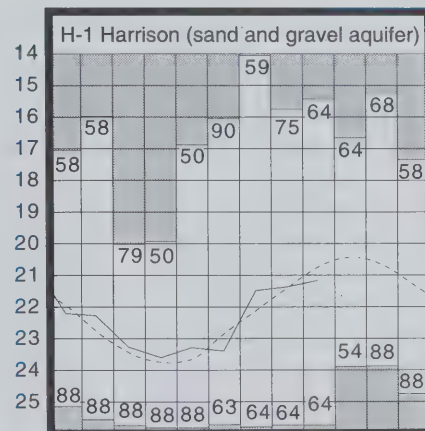
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 12.94 | +0.37 | +1.75 | +2.28 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 6.73 | +0.12 | +0.22 | +0.36 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.45 | +1.22 | +0.39 | +1.79 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.20 | -0.49 | +0.20 | +1.78 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.46 | +0.32 | +0.57 | -0.03 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.45 | -0.42 | +0.31 | +1.35 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.80 | -1.40 | +0.79 | +1.80 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Record high and low, year of occurrence

SUMMARY

Precipitation was generally below normal in the northern two-thirds of Ohio and above normal in the southern one-third. Streamflow was above normal in all but the western and northwestern areas of the state. Reservoir storage increased and continued to remain at above normal levels. Ground water levels showed net improvement during the month and were at noticeably higher levels than a year ago. Lake Erie level rose 0.33 foot and was 0.59 foot above the long-term March level. The first half of the 1996 water year was beneficial for water supplies throughout the state.

NOTES AND COMMENTS

OWWA 1996 WELL CONFERENCE

The 1996 Ohio Water Well Association (OWWA) Well Conference will be held on May 18, 10 am - 6 pm, at the Americana Amusement Park near Monroe (Butler County). There will be demonstrations on well cleaning, well rehabilitation, grouting and chemical safety. Three drilling rigs will be working throughout the day. Experts will be on hand to operate a down hole camera, gamma log a well, and inspect pumps pulled from working wells. The 70-acre amusement park will not be open to the general public, but will be open to conference attendees and their families.

The cost to attend the conference is \$25 which also includes lunch and admission to the park. Spouses and children will receive a discount rate of \$15 (children under 12, \$7.50). For more information, contact:

Tom Jenkins, President or Dan Schlosser, Executive Director
Ohio Water Well Association
P.O. Box 310
Caledonia, Ohio 43314
Phone: (419) 845-2023
Fax: (419) 845-2026

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservec District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
GOVERNOR

Donald C. Anderson
DIRECTOR

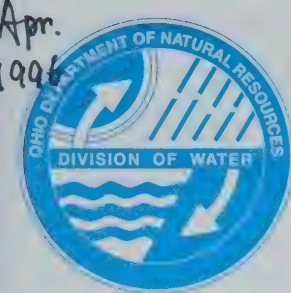
Michelle Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

April 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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PRECIPITATION during April was above normal throughout Ohio. The state average was 5.61 inches, 2.10 inches above normal. This ranks as the sixth wettest April for the state as a whole during the past 114 years. Regional averages ranged from 8.58 inches, 4.77 inches above normal, for the Southwest Region to 3.87 inches, 0.56 inch above normal, for the Northwest Region. This was the wettest April of record for the Southwest Region and the third wettest for the West Central Region. Milford (Clermont County) reported the greatest amount of precipitation for the month, 9.89 inches. Several other locations in southwestern Ohio also reported more than 9 inches of precipitation for April. Hicksville (Defiance County) reported the least amount of April precipitation, 2.44 inches.

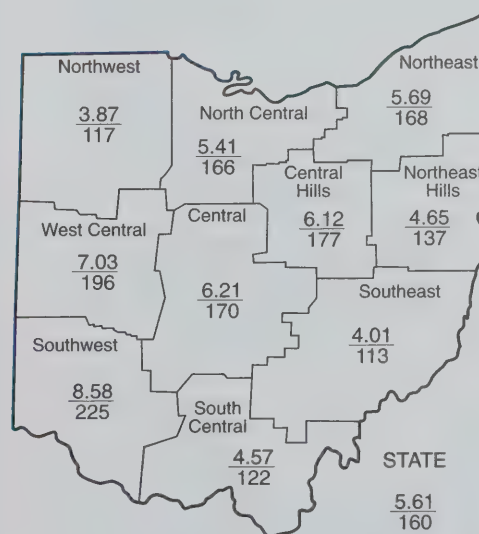
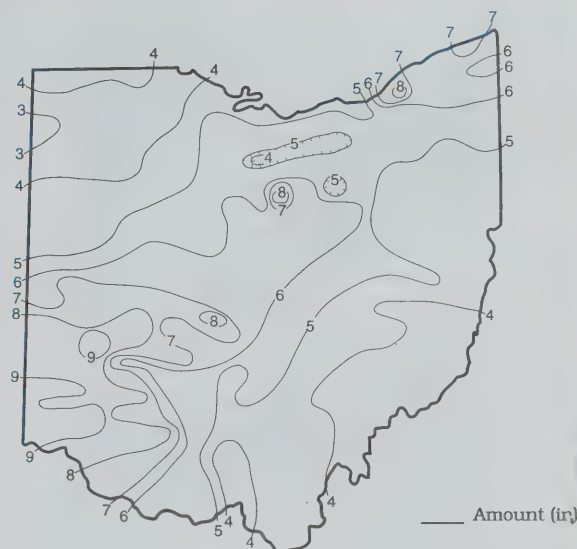
Most of the precipitation during April fell as rain, but snow showers and squalls contributed to the precipitation during the first half of the month. Snow totals for the month were near normal in most locations. This snowfall added enough to the accumulated season total to make this the first or second snowiest winter season for many locations.

Most of the precipitation during April fell as rain during the second half of the month. The greatest amounts fell from southwestern Ohio up through the central part of the state and on into northeastern Ohio. The month started with rain changing to snow from a storm that started during the last days of March. Some locations reported between 1 and 2 inches of precipitation from this storm. Scattered showers and snow squalls continued off and on during the first two weeks of April with most locations reporting 0.5 inch or less of additional precipitation. Heavier and more widespread storms started after the middle of the month. Several storm periods produced between 0.25 and 0.5 inch of precipitation, but two noteworthy periods had much greater precipitation. The first was during April 22-24 when most areas in the state received between 1 and 2 inches of rain. The second was during April 28-30 when once again, most areas of the state reported more than 1 inch of rain. Many places received more than 2 inches of rain during this period and as much as 4 inches was reported at some locations in southwestern Ohio. Moderate flooding of low-lying areas followed these both of these storms. The amount of rain and the number of days during which precipitation fell resulted in soils remaining wet and/or near saturation throughout much of the month. The Ohio Agricultural Statistics Service reports that (as of early May) soil moisture is rated as being adequate in 10 percent of the state and surplus in 90 percent of the state. The above normal precipitation has been beneficial for water supplies but has resulted in moderate flooding and also has greatly delayed agricultural planting activities throughout the state.

(continued on back)

PRECIPITATION

PRECIPITATION APRIL 1996



Average (in)
Percent of normal

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.56 | -0.67 | -1.28 | -2.38 | -7.69 | +0.6 |
| North Central | +2.16 | +1.45 | +1.48 | +3.77 | +3.06 | +2.3 |
| Northeast | +2.30 | +2.19 | +3.78 | +4.33 | +2.88 | +3.5 |
| West Central | +3.45 | +2.35 | +3.09 | +10.47 | +4.09 | +4.0 |
| Central | +2.55 | +2.15 | +2.47 | +9.20 | +4.59 | +3.4 |
| Central Hills | +2.67 | +2.63 | +2.95 | +6.45 | +4.57 | +3.5 |
| Northeast Hills | +1.25 | +1.10 | +1.63 | +1.87 | -1.41 | +2.0 |
| Southwest | +4.77 | +4.02 | +4.49 | +11.43 | +4.26 | +3.6 |
| South Central | +0.83 | +0.48 | +1.22 | +5.06 | -1.03 | +2.3 |
| Southeast | +0.47 | +2.06 | +3.40 | +5.50 | +1.94 | +3.0 |
| State | +2.10 | +1.78 | +2.33 | +5.58 | +1.55 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,223 | 155 | 118 | 138 | 112 |
| Great Miami River at Hamilton | 3,630 | 10,799 | 203 | 116 | 137 | 160 |
| Huron River at Milan | 371 | 877 | 170 | 137 | 126 | 120 |
| Killbuck Creek at Killbuck | 464 | 793 | 105 | 108 | 133 | 120 |
| Little Beaver Creek near East Liverpool | 496 | 896 | 99 | 119 | 127 | 113 |
| Maumee River at Waterville | 6,330 | 7,956 | 83 | 64 | 88 | 82 |
| Muskingum River at McConnelsville | 7,422 | 12,470 | 82 | 111 | 119 | 117 |
| Scioto River near Prospect | 567 | 1,049 | 129 | 93 | 130 | 160 |
| Scioto River at Higby | 5,131 | 10,800 | 153 | 117 | 132 | 161 |
| Stillwater River at Pleasant Hill | 503 | 1,497 | 209 | 105 | 140 | 159 |

STREAMFLOW during April was above normal throughout most of Ohio, but slightly below normal in the northwestern and eastern areas of the state. Flows in southwestern and extreme northeastern Ohio were high enough to be considered excessive. April flows were seasonally less than the flows for March in most areas of the state except in southwestern and extreme northeastern Ohio where they were greater.

Flows at the beginning of the month were below normal in many areas of the state, but above normal in southwestern, south-central, and north-central Ohio where they were responding to precipitation that fell on March 31. Generally, flows declined through mid-month with most areas recording the month's lowest flows during April 14-15, but day or two earlier in northeastern Ohio. Flows during the second half of April were significantly greater than during the first half following several periods of widespread precipitation.

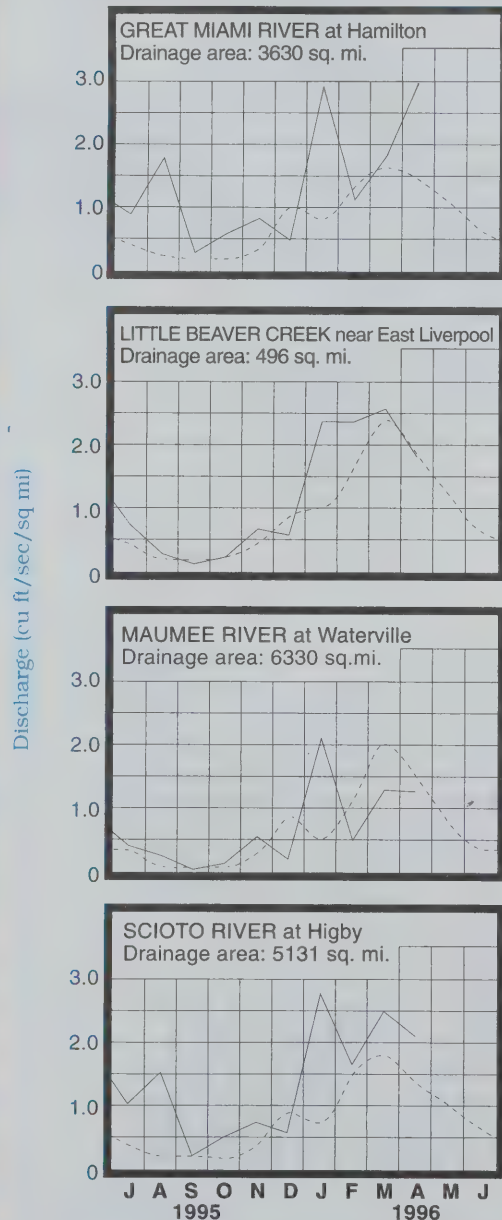
The two most notable periods were April 22-24 and 28-30. Drainage basins in northern Ohio recorded their greatest April flows following the storms during April 22-24. Southern Ohio drainage basins had their greatest flows on the last day of the month following these and then more storms during April 28-30. Moderate flooding of low-lying areas, especially in central and southwestern Ohio, occurred during both of these periods. Some small stream and urban flooding was also reported at the end of the month. Flows were noticeably above normal statewide as April ended.

RESERVOIR STORAGE for water supply during April increased in both the Mahoning and Scioto river basins. Storage continued to remain noticeably above normal in both basins.

Reservoir storage at the end of April in the Mahoning basin index reservoirs was 117 percent of rated capacity for water supply compared with 98 percent for last month and 97 percent for April 1995. Month-end storage in the Scioto basin index reservoirs was 108 percent of rated capacity for water supply compared with 106 percent for last month and 104 percent for April 1995.

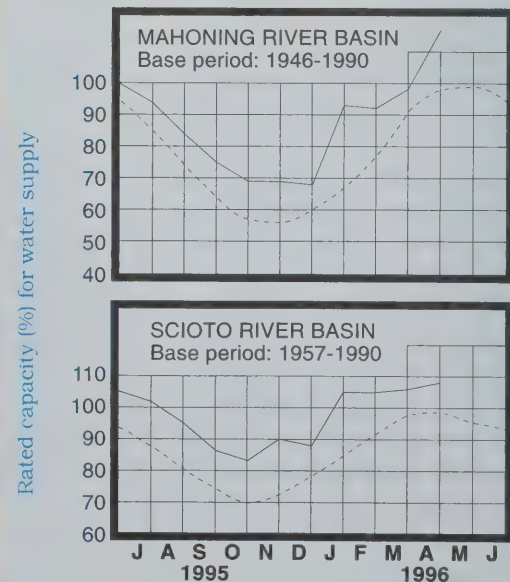
Surface-water supplies continue to remain in excellent condition throughout the state. Water-supply reservoirs, both on- and off- stream, are at or near capacity and recreational reservoirs are at or above summer pool levels.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current

Normal - - - - Current ————

(continued from front page)

Precipitation for the 1996 calendar year is above normal throughout most of the state; only the Northwest Region has slightly below normal precipitation. The state average is 14.69 inches, 2.80 inches above normal. Regional averages range from 18.69 inches, 5.11 inches above normal, for the Southwest Region to 9.96 inches, 0.24 inch below normal, for the Northwest Region.

Precipitation for the 1996 water year is above normal throughout Ohio. The state average is 23.83 inches, 4.37 inches above normal. Regional averages range from 28.36 inches, 6.59 inches above normal, for the Southwest Region to 17.74 inches, 0.51 inch above normal, for the Northwest Region.

SUMMARY

Precipitation was above normal throughout the state. Streamflow was above normal except in a few basins in northwestern and eastern Ohio. Moderate flooding of low-lying areas occurred during the last week of the month. Reservoir storage increased and remained above normal. Ground water levels improved in most aquifers and were noticeably higher than they were a year ago, but still remained slightly below normal in some eastern areas of the state. Lake Erie level rose 0.23 foot and was 0.30 foot above the long-term April average.

NOTES AND COMMENTS

NEW PUBLICATION

The Ground Water Resources of Williams County
by William C. Haiker

Ground water resources maps are prepared by staff hydrogeologists. These maps show the regional ground water characteristics based on interpretations of water well drilling records and local geology. These color-coded maps provide well log data for many point locations. Information provided by the maps include typical depths of wells, water-bearing formations and estimated yields for wells in the area.

Ground water resources maps can be used as a guide to locate new or expand existing ground water supplies. The maps are useful to homeowners, ground water consultants, engineers, planners and developers. Ground water resource maps have been completed for 87 of Ohio's 88 counties.

Each ground water resources map costs \$8.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

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| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service.

1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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May
1996



MONTHLY WATER INVENTORY REPORT FOR OHIO

May 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

JY03 '96

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PRECIPITATION during May was markedly above normal throughout most of the state with only a few areas along the Lake Erie coastline having below normal precipitation. The state average was 6.35 inches, 2.60 inches above normal. This ranks as the fifth wettest May during the past 114 years. Regional averages ranged from 10.08 inches, 6.16 inches above normal, for the Southwest Region to 3.84 inches, 0.33 inch above normal, for the North Central Region. This was the second wettest May of record for the South Central, Southeast, and Southwest regions, the fourth wettest May for the Central Region, and tied for the fifth wettest May in the West Central Region. Perintown (Clermont County) reported the greatest amount of precipitation during May, 13.08 inches. Several other locations in southwestern Ohio reported more than 10 inches of rain for May. Parma (Cuyahoga County) reported the least amount of May precipitation, 1.98 inches.

Ask anyone. It was wet during May. In many places, it rained on more than 20 days of the month. Showers and thunderstorms continually crossed the state. Locally heavy downpours were common. The rains fell on soils already at or near saturation as the result of the noticeably above normal precipitation during April. Flooding was a problem throughout much of the month. Some drying after the middle of the month allowed farmers a few days of field work, but planting activities are way behind schedule. At the end May, the Ohio Agricultural Statistics Service reported that soil moisture was rated as being adequate in 42 percent of the state and surplus in 58 percent of the state.

The first half of May was very wet in most areas of Ohio with rain falling on nearly every day. Storms periods of note which produced heavy rain occurred during May 3-4 in southwestern and southern Ohio, May 8-9 and May 10-11 statewide, May 15 in southern Ohio, and May 16-17 in extreme northwestern Ohio where more than 4 inches of rain was officially reported and unofficial sources reported amounts of more than 7 inches. Some areas in the northern and northeastern areas of the state started to dry out during the last week or two of the month, but in the southern half of the state it kept raining. Additional heavy storms occurred during May 24 and May 27-29 in the southern half of the state.

Precipitation for the 1996 calendar year is above normal throughout the state. The state average is 21.04 inches, 5.40 inches above normal. Regional averages range from 28.85 inches, 11.35 inches above normal, for the Southwest Region to 14.21 inches, 0.47 inch above normal, for the Northwest Region. Precipitation has been noticeably above normal the past two months throughout most of the southern two-thirds of the state. For the state as a whole, this was the wettest April-May during the past 114 years. Many locations have received between one-third and one-half of their normal annual precipitation during April and May.

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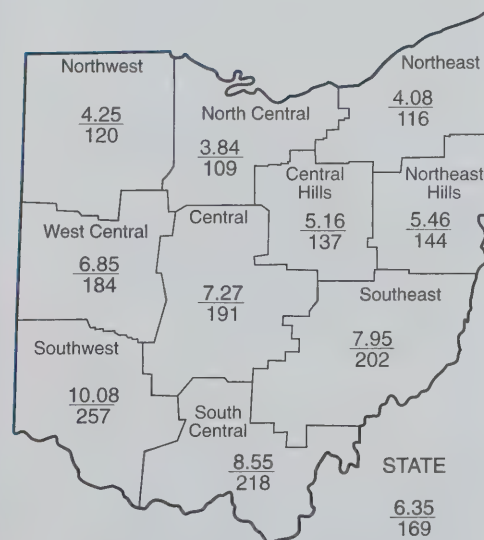
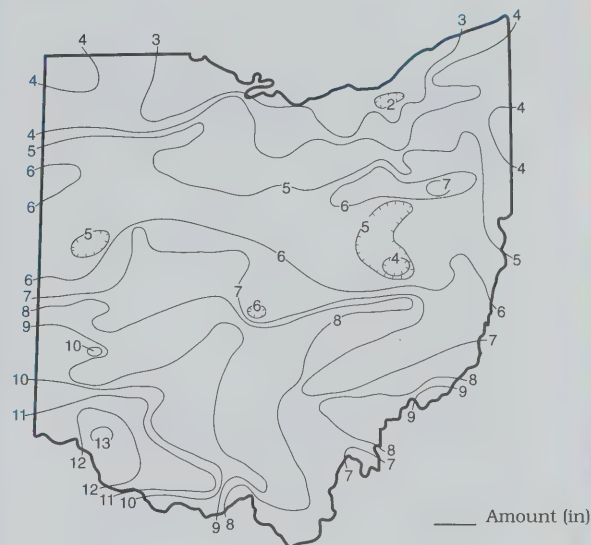
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.71 | +0.70 | -0.82 | -1.87 | -4.95 | +1.1 |
| North Central | +0.33 | +2.03 | +1.11 | +2.71 | +4.92 | +1.1 |
| Northeast | +0.55 | +2.63 | +3.46 | +4.04 | +4.84 | +2.1 |
| West Central | +3.13 | +5.58 | +5.98 | +10.51 | +8.44 | +4.4 |
| Central | +3.46 | +5.57 | +6.17 | +10.18 | +9.53 | +3.8 |
| Central Hills | +1.39 | +3.83 | +4.18 | +6.06 | +7.41 | +3.1 |
| Northeast Hills | +1.68 | +2.70 | +3.22 | +2.15 | +0.92 | +2.0 |
| Southwest | +6.16 | +11.06 | +11.32 | +12.52 | +11.43 | +4.3 |
| South Central | +4.62 | +5.27 | +6.68 | +6.28 | +4.16 | +2.8 |
| Southeast | +4.01 | +5.39 | +7.48 | +6.55 | +6.68 | +3.4 |
| State | +2.60 | +4.47 | +4.88 | +5.92 | +5.36 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION MAY 1996



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,786 | 289 | 143 | 140 | 122 |
| Great Miami River at Hamilton | 3,630 | 17,465 | 446 | 188 | 167 | 181 |
| Huron River at Milan | 371 | 856 | 319 | 162 | 134 | 135 |
| Killbuck Creek at Killbuck | 464 | 1,710 | 345 | 169 | 154 | 142 |
| Little Beaver Creek near East Liverpool | 496 | 1,448 | 250 | 128 | 144 | 126 |
| Maumee River at Waterville | 6,330 | 16,892 | 334 | 124 | 111 | 102 |
| Muskingum River at McConnellsville | 7,422 | 28,470 | 291 | 146 | 138 | 135 |
| Scioto River near Prospect | 567 | 1,888 | 448 | 169 | 150 | 176 |
| Scioto River at Higby | 5,131 | 24,916 | 471 | 196 | 174 | 183 |
| Stillwater River at Pleasant Hill | 503 | 1,695 | 439 | 169 | 157 | 165 |

STREAMFLOW during May was noticeably above normal throughout Ohio. Flows were high enough to be considered excessive statewide. Many gauging stations recorded record or near-record May flows. Record May flows were recorded at the following gauging stations used in this report: Great Miami River at Hamilton; Killbuck Creek at Killbuck; Muskingum River at McConnellsville; Scioto River at Higby; Scioto River at Prospect; and Stillwater River at Pleasant Hill. The gauging station for the Grand River near Painesville recorded its second greatest May flow and for the Maumee River at Waterville, its third greatest May flow. May flows were greater than the flows for April in most areas of the state, but slightly less in some extreme north-central and northeastern Ohio drainage basins.

Flows at the beginning of May were noticeably above normal throughout the state. Many drainage basins in the western, southwestern, and central areas of the state recorded their greatest flows for May on the first or second day of the month following widespread storms at the end of April. Flooding occurred in many areas of the state and also along the Ohio River during this period. Additional flooding was reported during May 7-9 and 11-12 following additional storms. Drainage basins in the northern and eastern areas of the state recorded their greatest flows for May during these periods. On May 17, locally severe thunderstorms in the extreme northwestern Ohio counties caused small stream and urban flooding. Rain amounts of more than 7 inches were reported. Additional small stream flooding was reported in the eastern area of the state during May 24-25 following yet additional storms.

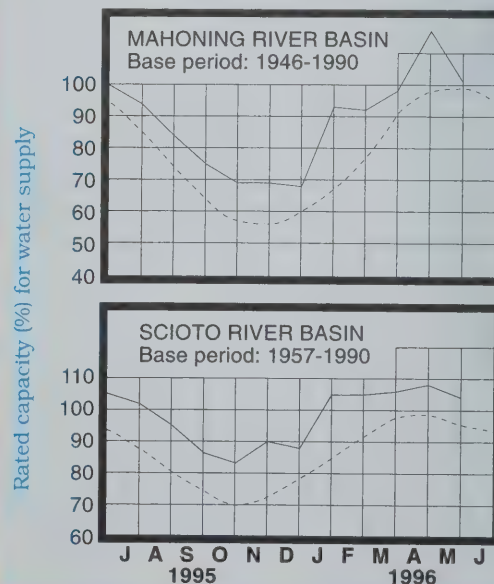
Governor Voinovich requested President Clinton to declare 14 Ohio counties disaster areas as a result of flooding during the month. Officials estimated that more than \$11 million in damage occurred in the following counties: Adams, Belmont, Brown, Butler, Clermont, Columbiana, Defiance, Gallia, Hamilton, Jefferson, Meigs, Paulding, Scioto, and Williams. Additional information on this request will be available in next month's report.

Lowest flows for the month occurred during the Memorial Day weekend in the western half of the state and at the end of the month in the eastern half. At the end of the month, flows remained above normal in the western half of the state, but had fallen to slightly below normal in many eastern Ohio drainage basins.

RESERVOIR STORAGE for water supply during May declined in both the Mahoning and Scioto river basin index reservoirs. Storage continued to remain above normal in both basins.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 101 percent of rated capacity for water supply compared with 117 percent for last month and 105 percent for May 1995. Month-end storage in the Scioto basin index reservoirs was 104 percent of rated capacity for water supply compared with 108 percent for last month and 105 percent for May 1995.

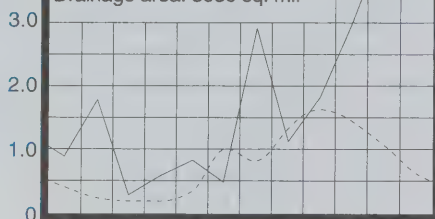
RESERVOIR STORAGE FOR WATER SUPPLY



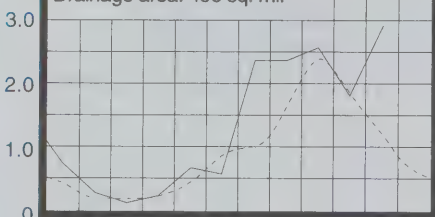
MEAN STREAM DISCHARGE

(4.81-Off the chart)

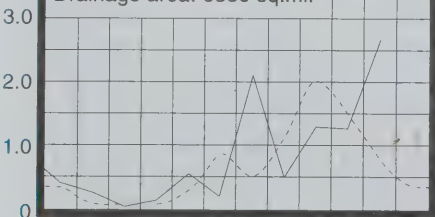
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.

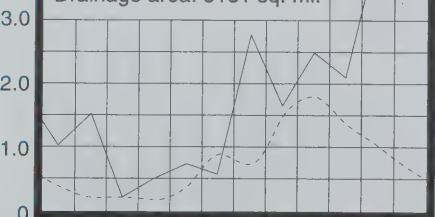


MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



(4.86 - Off the chart)

SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



Base period for all streams: 1961-1990

Normal - - - - Current ———

Surface-water supplies are in excellent condition throughout the state. Water-supply reservoirs, both on- and off-stream, are at or near capacity and recreational reservoirs are at or above summer pool levels. Reservoirs utilized designed flood storage capacity throughout much of the month. Some reservoirs in the lower Scioto River basin were at record or near-record levels during the month.

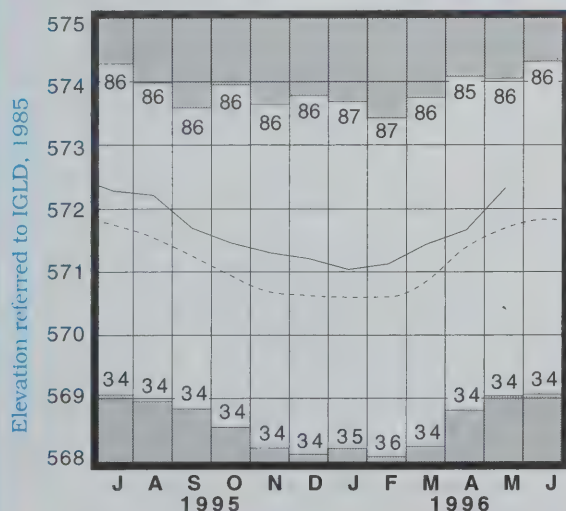
GROUND WATER LEVELS during May rose throughout the state in response to recharge from above normal precipitation during the past two months. Net changes during May from last month's levels were noticeably greater than usually observed. Generally, shallow unconsolidated aquifers rose during the first three weeks of the month and then declined during the last week. Deeper unconsolidated aquifers and most consolidated aquifers showed a gradual upward trend throughout the month. Additional delayed recharge to deeper aquifers can be expected in many areas of the state especially where May precipitation was noticeably above normal.

Ground water levels are noticeably higher than they were a year ago in most aquifers. Current levels range from slightly above to more than three feet higher than the May 1995 levels. Ground water levels in most aquifers throughout the state are above normal. An exception is in eastern Ohio where levels in some aquifers continue to remain slightly below normal. Levels in these aquifers have shown significant improvement during the past several months with additional improvement possible. Typically, sustained recharge to most aquifers is nearing an end by this time of the year. However, current soil and climatic conditions may provide an extension to the recharge season. The above normal precipitation during the past few months has been beneficial for ground water supplies, but has delayed field activities for many of Ohio's farmers. Ground water supplies are in a favorable position as the summer season of higher use, natural discharge, and increased evapotranspiration approaches.

LAKE ERIE level rose during May. The mean level was 572.34 feet (IGLD-1985), 0.65 foot above last month's mean level and 0.65 foot above normal. This month's level is 0.03 foot above the May 1995 level and 3.14 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during May averaged 3.2 inches, 0.1 inch below normal. The entire Great Lakes basin averaged 2.1 inches of precipitation during May, 0.9 inch below normal. For calendar year 1996 through May, the Lake Erie basin has averaged 14.4 inches of precipitation, 0.7 inch above normal and the entire Great Lakes basin has averaged 12.4 inches, 0.8 inch above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

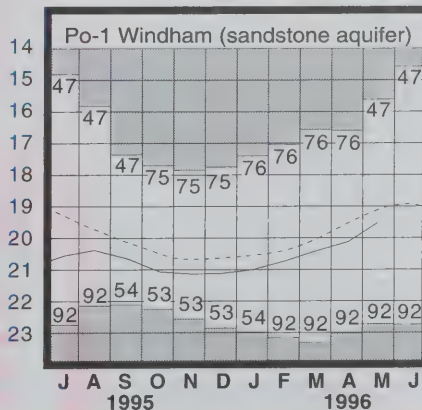
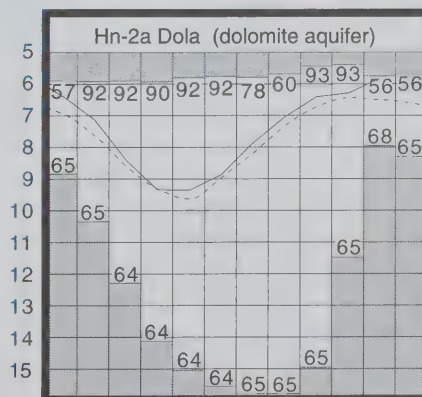
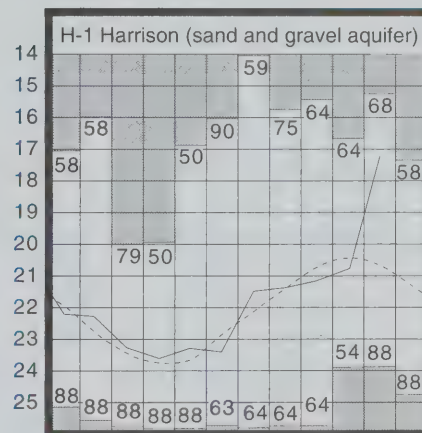
Record high and low, year of occurrence

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 11.79 | +0.93 | +1.42 | +2.77 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 6.35 | +0.67 | +0.38 | +0.71 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 40.02 | +2.61 | +0.83 | +2.41 |
| H-1 | Harrison, Hamilton Co. | Gravel | 17.26 | +3.42 | +3.54 | +3.50 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 5.86 | +0.67 | +0.49 | +0.23 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.54 | -0.45 | +0.62 | +1.57 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 11.42 | -0.29 | +1.42 | +3.19 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

Precipitation for the 1996 water year is above normal throughout the state. The state average is 30.19 inches, 6.97 inches above normal. Regional averages range from 38.52 inches, 12.83 inches above normal, for the Southwest Region to 21.99 inches, 1.22 inches above normal, for the Northwest Region. The above normal precipitation during the 1996 water year has been beneficial for water supplies, but has caused delays in agricultural planting activities and flooding problems in many areas of Ohio.

SUMMARY

Precipitation was noticeably above normal throughout most of Ohio with only a few areas along the Lake Erie shoreline receiving below normal precipitation. For the state as a whole, this was the fifth wettest May during the past 114 years. Streamflow was excessive throughout the state with many locations recording record or near-record high May flows. Governor Voinovich requested a disaster declaration be made for 14 counties which received an estimated \$11 million in flood related damage. Reservoir storage was above normal throughout the state. Ground water levels improved in all aquifers. Lake Erie level rose 0.65 foot and was 0.65 foot above the long-term May average. Water supplies are in excellent condition throughout the state.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

The Ground Water Resources of Perry County

by Paul N. Spahr

Ground water resources maps are prepared by staff hydrogeologists. These maps show the regional ground water characteristics based on interpretations of water well drilling records and local geology. These color-coded maps provide well log data for many point locations. Information provided by the maps include typical depths of wells, water-bearing formations and estimated yields for wells in the area.

Ground water resources maps can be used as a guide to locate new or expand existing ground water supplies. The maps are useful to homeowners, ground water consultants, engineers, planners and developers.

Ground water resource maps have been completed for all of Ohio's 88 counties. Currently, 10 counties are out of print. Those counties are: Allen, Clark, Hamilton, Knox, Mahoning, Medina, Portage, Richland, Ross, and Warren. These out of print maps will be revised and/or reprinted as funds are available. The Division of Water invites you to an open house on June 28, 1996 from 2-4 pm to celebrate the completion of the county ground water resource mapping program.

Each ground water resources map costs \$8.00. They can be purchased at or ordered from the address listed below.

State of Ohio Technical Guidance for Sealing Unused Wells

by the State Coordinating Committee on Ground Water

This guidance document outlines the materials and methodologies that should be used to properly seal a well. The intent of the guidance is to provide a comprehensive discussion of all elements involved in the well sealing process, including basic ground water principles and an introduction to well drilling and construction methods. While not a regulatory document itself, the guidance also covers existing regulations concerning well sealing and the agencies that administer them. The guidance was developed by a work group consisting of representatives from several state agencies and the drilling industry.

The guidance document is free upon request. Call or write the Ohio Department of Natural Resources, Division of Water at the address listed below to obtain a copy.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

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|----------------------|---------|
| under \$10.01 | \$2.00 |
| \$10.01 - \$20.00 | \$3.00 |
| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



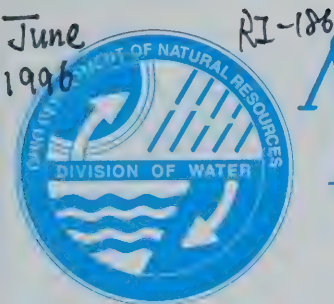
DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Donald C. Anderson
Director

Michele Wilks
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

June 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

AG 02 '96

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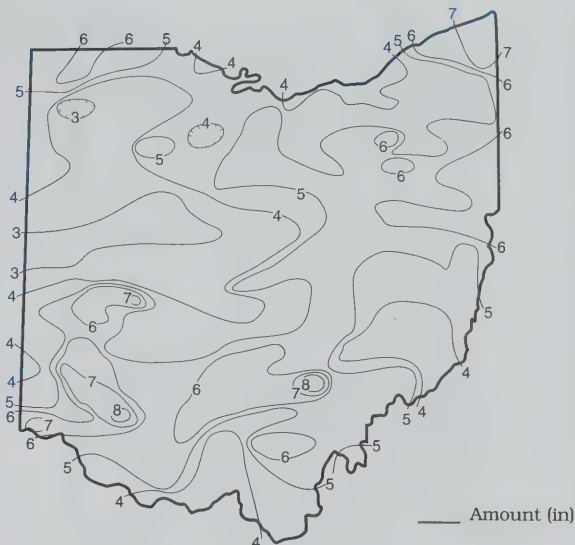
PRECIPITATION during June was above normal throughout most of Ohio with only a few scattered locations, especially in the west-central area of the state, having below normal precipitation. The state average was 4.88 inches, 0.92 inch above normal. Regional averages ranged from 5.77 inches, 1.72 inches above normal, for the Southwest Region to 4.09 inches, 0.03 inch above normal, for the Central Region. Fayetteville (Brown County) reported the greatest amount of precipitation during June, 8.66 inches. Nelsonville (Athens County) reported 8.22 inches of rain for the month, the only other reporting location exceeding 8 inches of June precipitation. Kenton (Hardin County) reported the least amount of June precipitation, 2.25 inches.

Most of the precipitation in June fell during the first half of the month. Many locations reported rain on more than 10 of the first 15 days of June, continuing the trend that started in the middle of April. Generally, daily amounts were between 0.1 and 0.5 inch, but most stations had from 1 to 3 days on which 0.5 to more than 1 inch was recorded. Most of these larger storms occurred during June 6-7, 9-10, and 14. Conditions more typical of summer finally arrived in Ohio during the second half of June which allowed fields to dry and farmers to work around the clock to complete planting. Scattered storms, some locally severe with more than 1 inch of rain, were the norm for the second half of June. Many areas reported storms during June 18-19 and again during June 21-24. An especially strong storm hit Gallia and Lawrence counties during June 22-23. As much as 3 inches of rain which fell quickly was reported. Small stream flooding was especially severe in Gallia County where many roads and bridges sustained damage.

Precipitation for the 1996 calendar year is above normal throughout the state. The state average is 25.92 inches, 6.32 inches above normal. Regional averages range from 34.62 inches, 13.07 inches above normal, for the Southwest Region to 18.72 inches, 1.15 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 6 months column). The above normal precipitation during the past few months has caused considerable delays in many agricultural planting activities and several areas have had standing water and other flooding problems.

Precipitation for the 1996 water year is above normal throughout Ohio. The state average is 35.07 inches, 7.90 inches above normal. Regional averages range from 44.29 inches, 14.55 inches above normal, for the Southwest Region to 26.50 inches, 1.90 inches above normal, for the Northwest Region. The above normal precipitation during the 1996 water year recharge period has been beneficial for water supplies throughout the state. Ground water supplies have improved to near or above normal levels statewide.

PRECIPITATION JUNE 1996

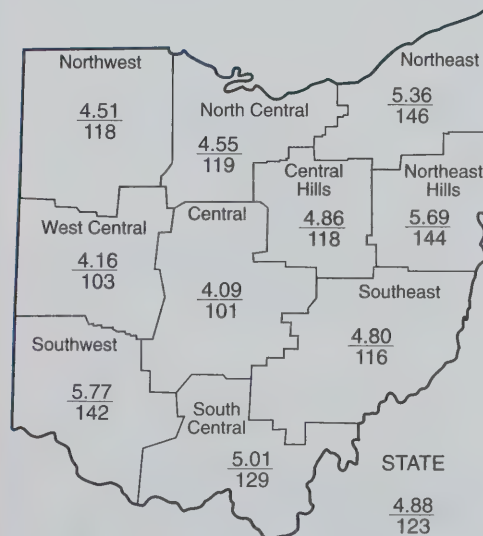


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.68 | +1.95 | +1.15 | -1.18 | -4.22 | +0.1 |
| North Central | +0.73 | +3.22 | +2.61 | +4.06 | +4.57 | +1.0 |
| Northeast | +1.68 | +4.53 | +5.22 | +5.83 | +6.53 | +3.1 |
| West Central | +0.12 | +6.70 | +6.80 | +10.32 | +7.99 | +3.4 |
| Central | +0.03 | +6.04 | +6.73 | +8.58 | +9.40 | +2.6 |
| Central Hills | +0.75 | +4.81 | +5.65 | +6.66 | +7.20 | +3.0 |
| Northeast Hills | +1.73 | +4.66 | +5.58 | +3.28 | +2.50 | +1.9 |
| Southwest | +1.72 | +12.65 | +13.07 | +14.01 | +13.37 | +4.1 |
| South Central | +1.13 | +6.58 | +7.97 | +7.37 | +5.89 | +1.8 |
| Southeast | +0.66 | +5.14 | +8.42 | +6.79 | +7.95 | +2.9 |
| State | +0.92 | +5.62 | +6.32 | +6.58 | +6.11 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 982 | 378 | 194 | 148 | 128 |
| Great Miami River at Hamilton | 3,630 | 8,209 | 352 | 263 | 198 | 191 |
| Huron River at Milan | 371 | 408 | 236 | 209 | 152 | 135 |
| Killbuck Creek at Killbuck | 464 | 886 | 337 | 199 | 168 | 150 |
| Little Beaver Creek near East Liverpool | 496 | 692 | 221 | 150 | 156 | 127 |
| Maumee River at Waterville | 6,330 | 10,301 | 453 | 171 | 135 | 112 |
| Muskingum River at McConnelsville | 7,422 | 16,100 | 271 | 172 | 158 | 143 |
| Scioto River near Prospect | 567 | 588 | 221 | 195 | 156 | 171 |
| Scioto River at Higby | 5,131 | 12,371 | 354 | 244 | 187 | 191 |
| Stillwater River at Pleasant Hill | 503 | 602 | 225 | 220 | 178 | 170 |

STREAMFLOW during June was noticeably above normal throughout the state. Flows were high enough to be considered excessive statewide. Although the June flows were excessive, they were noticeably less than the flows in May, averaging about half of those record or near-record May flows. The Scioto River at Higby gauging station recorded its second highest June flow for its period of record.

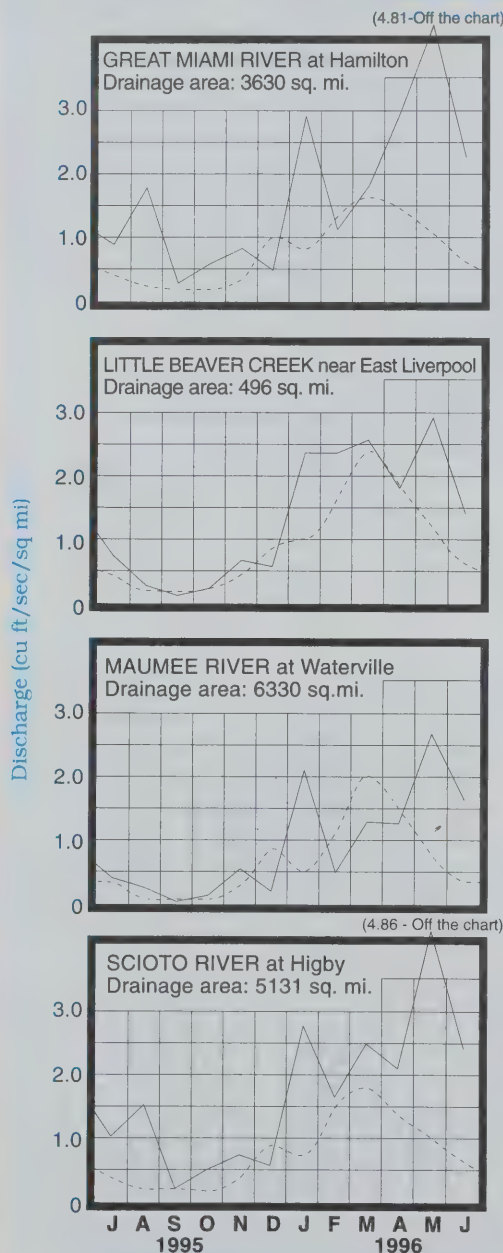
Flows at the beginning of the month were above normal throughout most of Ohio, but slightly below normal in the north-central and northeastern areas of the state. Flows returned to or remained at above normal levels for most of the month responding to many days with precipitation during the first half of the month. Greatest flows during June occurred during the second week of the month following nearly daily precipitation through June 14. High water continued to be a problem during this period, but only minor flooding was reported. Flows began to decline after mid-month as more typical summer conditions finally arrived in the state. Scattered thunderstorms during the second half of the month had only a local effect on streamflow. An isolated severe storm in Gallia and Lawrence counties during June 22-23 caused severe small stream flooding which damaged several roads and bridges. Lowest flows for June occurred at the end of the month in all drainage basins. Month-end flows were above normal in the southern and eastern areas of Ohio but below normal in the western and northern areas of the state.

President Clinton responded favorably to Governor Voinovich's request to have 14 Ohio counties designated as major disaster areas as a result of severe flooding in May and June. Those counties are: Adams, Belmont, Brown, Butler, Clermont, Gallia, Hamilton, Jefferson, Lawrence, Meigs, Monroe, Paulding, Scioto, and Williams. The declaration makes these counties eligible to receive federal disaster assistance.

RESERVOIR STORAGE during June increased slightly in the Mahoning basin reservoirs and declined slightly in the Scioto basin reservoirs. Storage remained above normal in both basins. Storage has been above normal for more than a year in both basins.

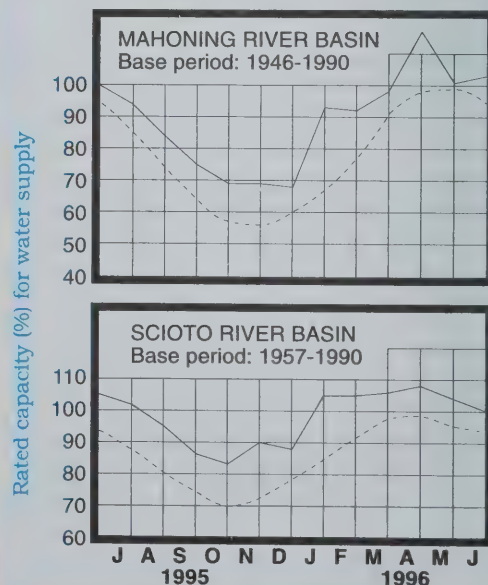
Reservoir storage in the Mahoning basin index reservoirs was 103 percent of rated capacity for water supply compared with 101 percent for last month and 100 percent for June 1995. Month-end storage in the Scioto basin index reservoirs was 100 percent of rated capacity for water supply compared with 104 percent for last month and 105 percent for June 1995. Surface water supplies continue to remain in excellent condition throughout the state.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

GROUND WATER LEVELS during June rose slightly in some aquifers and declined slightly in others. Generally, levels rose during the first half of the month and declined during the second half. Some consolidated aquifers gradually rose throughout the month.

This has been an excellent recharge season for ground water supplies. Ground water levels throughout most of the state are above normal with only a few areas having slightly below normal levels. Observation wells H-1 (Hamilton County), representing sand and gravel aquifers in southwestern Ohio, and Hn-2a (Hardin County), representing the carbonate aquifer of northwestern Ohio, both reached a record-high June level during the month. Current levels are noticeably higher than they were a year ago in most aquifers ranging from slightly above to more than three feet higher than the June 1995 levels. As a result of the return to more typical summer conditions during the second half of June, little additional recharge can be expected in many aquifers, but some deeper consolidated aquifers might receive a little more delayed recharge. Ground water supplies are in excellent condition throughout the state.

LAKE ERIE level rose noticeably during June. The mean level was 572.77 feet (IGLD-1985), 0.43 foot above last month's mean level and 0.95 foot above normal. This month's level is 0.36 foot above the June 1995 level and 3.57 feet above Low Water Datum.

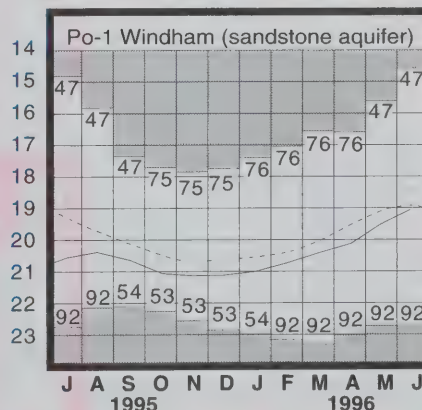
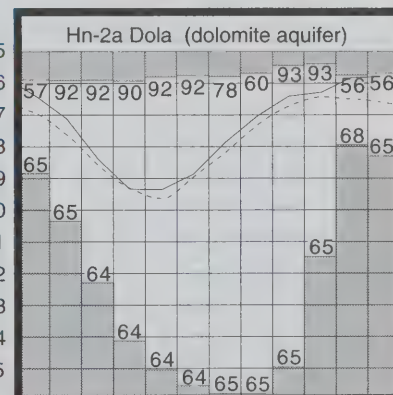
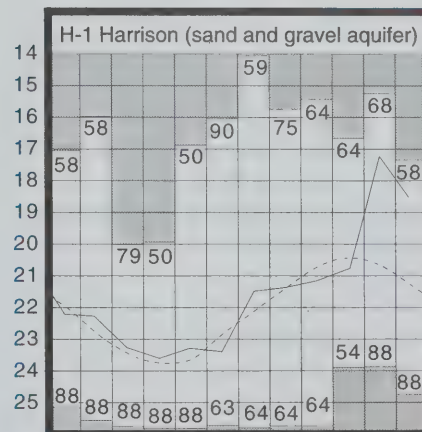
The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during June averaged 4.6 inches, 1.2 inches above normal. The entire Great Lakes basin averaged 4.1 inches of precipitation during June, 0.9 inch above normal. For calendar year 1996 through June, the Lake Erie basin has averaged 19.4 inches of precipitation, 2.3 inches above normal and the entire Great Lakes basin has averaged 16.9 inches, 2.1 inches above normal.

GROUND-WATER LEVELS

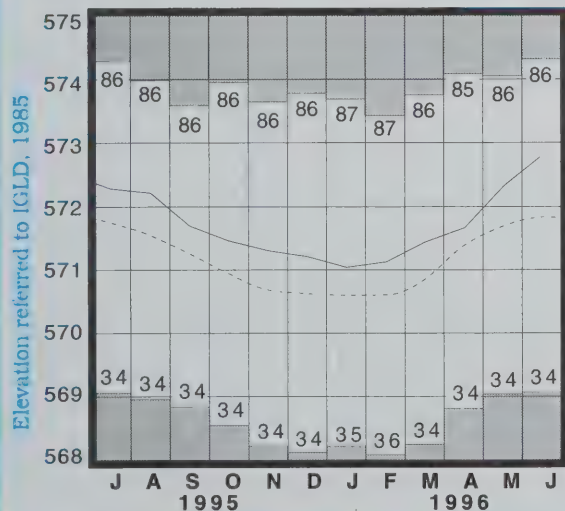
Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 12.07 | +1.84 | -0.28 | +1.34 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 6.41 | +0.96 | -0.06 | +0.64 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 39.98 | +3.07 | +0.04 | +2.18 |
| H-1 | Harrison, Hamilton Co. | Gravel | 18.52 | +2.78 | -1.26 | +2.60 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 5.80 | +0.83 | +0.06 | +0.29 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.08 | -0.16 | +0.46 | +1.70 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 11.40 | +0.49 | +0.02 | +2.53 |

GROUND-WATER LEVELS



LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Water level (ft below land surface)

Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990

Normal --- Current ———

SUMMARY

Precipitation was above normal throughout most of the state with only a few areas, especially in west-central Ohio, having below normal precipitation. Streamflow was excessive statewide. Water supply storage reservoirs were near capacity and remained at above-normal seasonal levels. Ground water levels continued to improve in some aquifers but declined slightly in others. Lake Erie level rose 0.43 foot and was 0.95 foot above the long-term June average. Both surface and ground water supplies are in good condition throughout the state.

NOTES AND COMMENTS

NEW PUBLICATION

1996 Ohio Directory of Drilling Contractors
compiled by Katherine M. Sprowls

The latest version of this directory (last published in 1991) contains updated information on water well and environmental drilling contractors operating in the state of Ohio. The contractors included in the directory responded to a letter from the Department of Natural Resources, Division of Water requesting updates on the information currently found in the Division of Water's database. Information available from the directory includes the state and county in which each contractor is based, current addresses and phone numbers, and a listing of the drilling and service capabilities of each company. New to this version is a separate listing of environmental drilling contractors. Also included in the directory are addresses and phone numbers for each county health department, the district offices and central office of the Ohio Department of Health, and the district offices and central office of the Ohio Environmental Protection Agency.

The directory is free upon request while supplies last. Call or write the Division of Water at the address below to obtain a copy.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

ACKNOWLEDGMENTS

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Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service: The Miami Consergency District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.

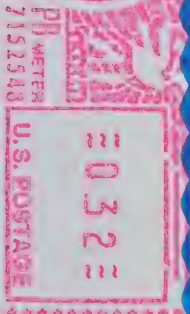
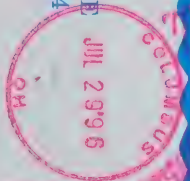
Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District,
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration,
National Weather Service.

Department
of Natural
Resources



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

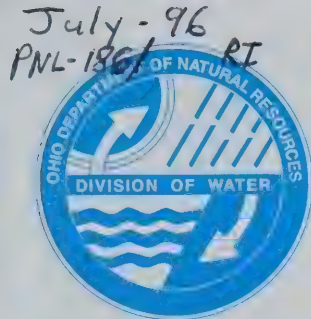


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Michelle Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

July 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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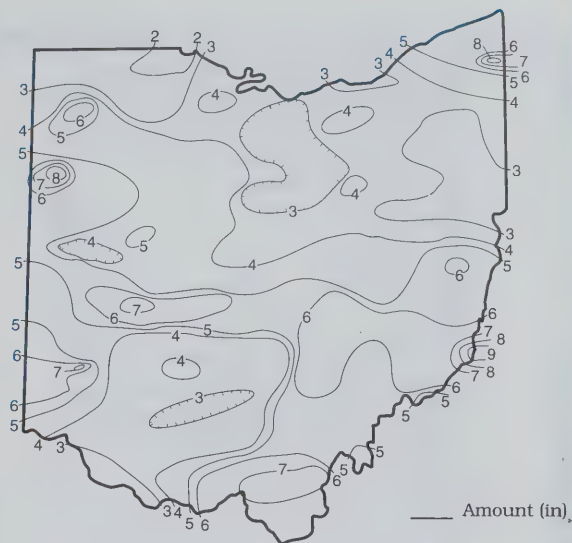
PRECIPITATION during July was above normal in western, central, south-eastern and extreme northeastern Ohio, but below normal in north-central, northeastern, extreme northwestern, and in a few south-central areas of the state. The state average was 4.41 inches, 0.49 inch above normal. Regional averages ranged from 5.92 inches, 1.55 inches above normal, for the Southeast Region to 3.49 inches, 0.03 inch above normal, for the North Central Region. Hannibal Locks and Dam (Monroe County) reported the greatest amount of precipitation during July, 9.75 inches; Andover (Trumbull County) reported 8.93 inches. Maumee State Forest (Fulton County) reported the least amount of July precipitation, only 1.79 inches; Toledo Express Airport (Lucas County) reported 1.81 inches.

Most of the precipitation during July fell in the second half of the month as showers and thunderstorms. There were a few widely scattered storms around the state during the first few days of the month and on July 8, but many areas of the state received no rain during the first half of the month. Storms started to become more widespread after July 13 and continued to persist through July 19. Some areas in the northern and northeastern areas of the state received more than 1 inch of rain on July 14 and some areas in south-central Ohio received more than 2 inches of rain on July 15. During July 17-18, storms crossed through the mid-section of the state and continued down through southeastern Ohio with some locations receiving more than 3 inches of rain. Showers and thunderstorms were again widespread during July 21-24 with some areas in southern Ohio reporting more than 1 inch of rain on July 24. The month ended much wetter than it started with storms during July 29-31. The greatest amounts during this period fell in the northeastern area of the state and in south-central Ohio where small stream flooding was reported. The Ohio Agricultural Statistics Service reports that at the end of July, soil moisture was reported as being short in 12 percent of the state, adequate in 78 percent of the state, and surplus in 10 percent of the state.

Precipitation for the 1996 calendar year is above normal throughout Ohio. The state average is 30.33 inches, 6.81 inches above normal. Regional averages range from 38.81 inches, 13.29 inches above normal, for the Southwest Region to 22.81 inches, 1.80 inches above normal, for the Northwest Region.

Precipitation for the 1996 water year is above normal throughout Ohio. The state average is 39.47 inches, 8.38 inches above normal. Regional averages range from 48.48 inches, 14.77 inches above normal, for the Southwest Region to 30.59 inches, 2.55 inches above normal, for the Northwest Region.

PRECIPITATION JULY 1996

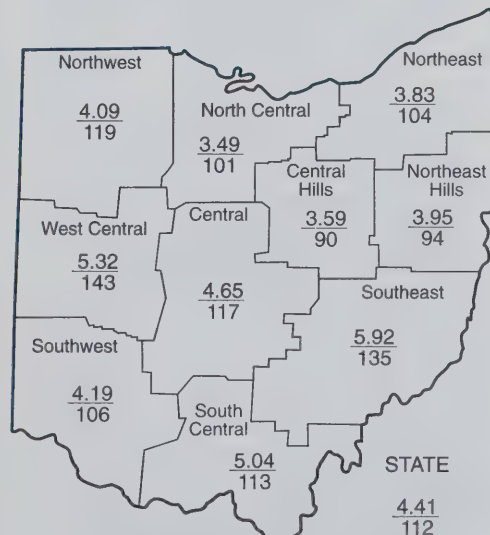


PRECIPITATION

| Region | This Month | DEPARTURE FROM NORMAL (IN.) | | | | Palmer Drought Severity Index* |
|-----------------|------------|-----------------------------|--------|---------|---------|--------------------------------|
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.65 | +2.04 | +1.37 | +1.12 | -2.91 | +0.9 |
| North Central | +0.03 | +1.09 | +2.54 | +3.52 | +5.59 | +0.4 |
| Northeast | +0.15 | +2.38 | +4.57 | +5.43 | +6.81 | +1.8 |
| West Central | +1.61 | +4.86 | +7.21 | +10.85 | +10.28 | +4.3 |
| Central | +0.69 | +4.18 | +6.33 | +9.08 | +10.32 | +2.2 |
| Central Hills | -0.40 | +1.74 | +4.37 | +6.78 | +7.35 | +3.3 |
| Northeast Hills | -0.26 | +3.15 | +4.25 | +4.77 | +2.92 | +2.1 |
| Southwest | +0.22 | +8.10 | +12.20 | +15.03 | +13.70 | +3.2 |
| South Central | +0.58 | +6.33 | +6.81 | +9.46 | +6.27 | +2.4 |
| Southeast | +1.55 | +6.22 | +8.28 | +10.18 | +8.49 | +3.3 |
| State | +0.49 | +4.01 | +5.80 | +7.63 | +6.91 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | This Month % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|---------------------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 178 | 62 | 196 | 131 | 128 |
| Great Miami River at Hamilton | 3,630 | 2,917 | 199 | 345 | 184 | 190 |
| Huron River at Milan | 371 | 46 | 63 | 223 | 154 | 132 |
| Killbuck Creek at Killbuck | 464 | 178 | 98 | 251 | 142 | 149 |
| Little Beaver Creek near East Liverpool | 496 | 194 | 92 | 169 | 132 | 124 |
| Maumee River at Waterville | 6,330 | 2,525 | 112 | 280 | 115 | 112 |
| Muskingum River at McConnsville | 7,422 | 4,330 | 100 | 236 | 149 | 144 |
| Scioto River near Prospect | 567 | 229 | 225 | 273 | 124 | 168 |
| Scioto River at Higby | 5,131 | 3,891 | 195 | 373 | 175 | 188 |
| Stillwater River at Pleasant Hill | 503 | 281 | 204 | 286 | 161 | 171 |

STREAMFLOW during July was above normal throughout most of Ohio but below normal in the north-central and northeastern areas of the state. Flows in the south-central drainage basins were high enough to be considered excessive. Flows for July were noticeably less than the flows in June.

Flows at the beginning of the month were above normal in most areas of Ohio, but below normal across the northern third of the state. Generally, flows declined until just before mid-month responding to the lack of precipitation throughout much of the state. Most drainage basins had their lowest flows for the month on or just prior to July 14 except in some northeast and north-central Ohio drainage basins where flows

were lowest on July 29. Flows increased rapidly after mid-month following widespread precipitation throughout much of the state on July 17-18. Greatest flows for the month occurred during July 18-20 in most areas of the state following these storms. A few drainage basins in north-central Ohio had their greatest flows at the end of the month following storms in that area. Flows at the end of the month were slightly above normal throughout most of the state, but below normal in northeastern Ohio.

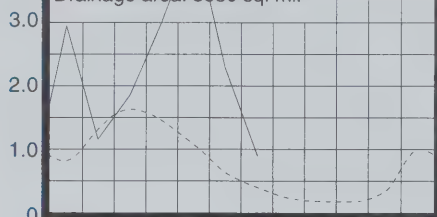
RESERVOIR STORAGE during July decreased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of July in the Mahoning basin index reservoirs was 92 percent of rated capacity for water supply compared with 103 percent for last month and 94 percent for July 1995. Month-end storage in the Scioto basin index reservoirs was 94 percent of rated capacity for water supply compared with 100 percent for last month and 102 percent for July 1995. Surface water supplies continue to remain in excellent condition throughout the state.

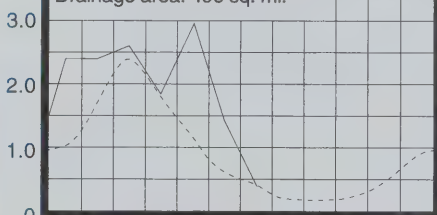
MEAN STREAM DISCHARGE

(4.81-Off the chart)

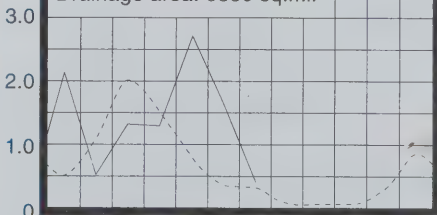
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.

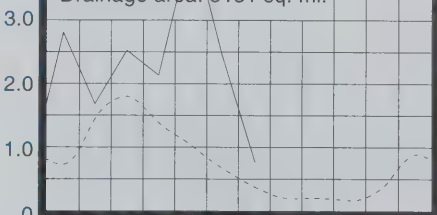


MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



(4.86 - Off the chart)

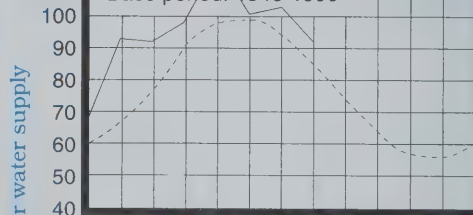
SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



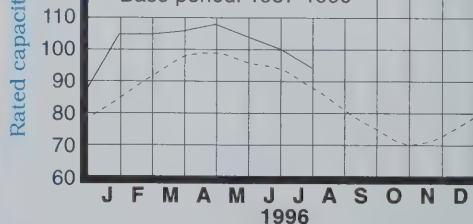
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



GROUND WATER LEVELS during July declined in most aquifers throughout the state. A few exceptions were noted in some shallow aquifers, especially those adjacent to streams and rivers where levels rose noticeably after mid-month. Generally, levels declined throughout the first half of the month in all aquifers. During the second half, levels rose in some aquifers, especially shallow aquifers adjacent to streams, and stabilized in other aquifers. Aquifer levels in areas that received below normal precipitation during July continued to decline through the end of the month.

Ground water supplies continue to remain in good condition throughout the state. Current levels range from about the same to nearly 2 feet higher than the levels of a year ago. Levels in most aquifers are above normal with only a few exceptions in some eastern areas of the state where levels are slightly below normal.

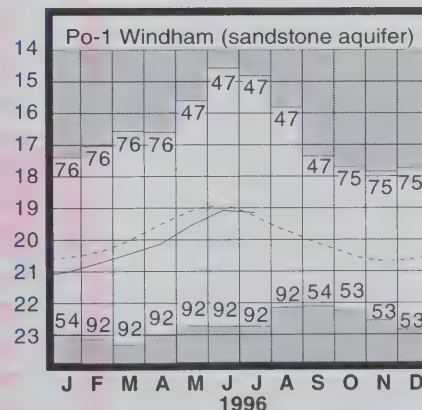
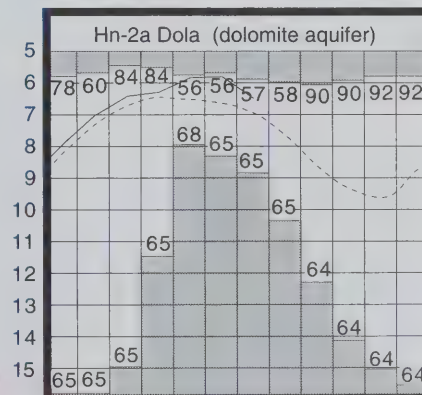
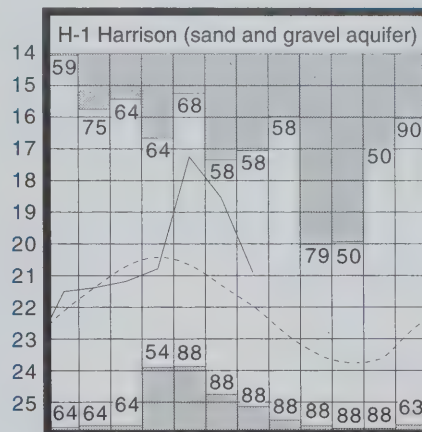
LAKE ERIE level rose during July. The mean level was 572.97 feet (IGLD-1985), 0.20 foot above last month's mean level and 1.22 feet above normal. This month's level is 0.66 foot above the July 1995 level and 3.77 feet above Low Water Datum.

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

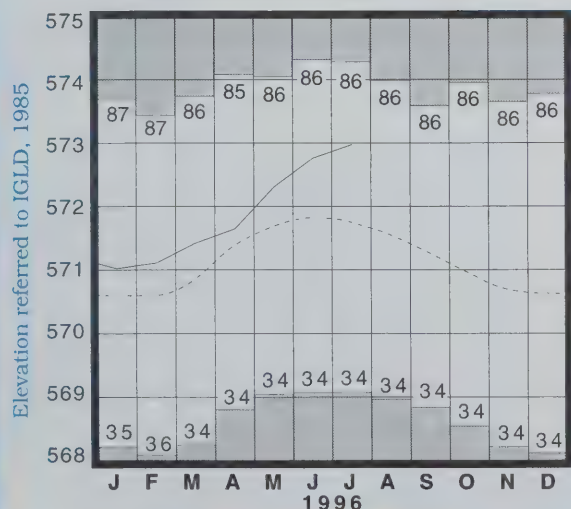
| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.68 | +0.44 | -2.61 | +0.93 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.27 | +0.53 | -0.86 | +0.36 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.37 | +2.09 | -1.39 | +1.10 |
| H-1 | Harrison, Hamilton Co. | Gravel | 20.90 | +1.06 | -2.38 | +1.33 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.50 | +0.45 | -0.70 | -0.06 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.16 | +0.13 | -0.08 | +1.42 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.75 | -0.23 | -1.35 | +1.69 |

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.
Po-1, 1947-1990

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current ———

SUMMARY

Precipitation was above normal in most areas of the state, but below normal in scattered areas across northern and south-central Ohio. Streamflow was above normal throughout most of Ohio, but below normal in the north-central and northeastern areas of the state. Reservoir storage declined but remained at above normal levels. Ground water levels declined in most aquifers. Lake Erie level rose 0.2 foot and was 1.22 feet above the long-term July average. Water supplies are in good condition throughout the state.

NOTES AND COMMENTS

NEW PUBLICATIONS

Identification of the Hydrologic System and Nonpoint Source Impacts in the Mad River Watershed

by Wayne Jones, Mike Schiefer, and Eric B. Sainey

The Division of Water has recently completed a study of the ground and surface water within the Upper Mad River watershed. The two and a half year project was funded in part by a nonpoint source implementation grant from the U.S. Environmental Protection Agency. The project assessed the effects of nonpoint source pollution in the Mad River watershed by defining the hydrologic system and investigating water quality variation within the watershed. The study focused on interpreting the interaction between ground water and surface water. To determine this interaction, extensive water quality samples, streamflow discharge measurements, and ground water level measurements were collected. A surface water model was designed and prepared for the basin to determine the ground water contribution to the surface water flow. In addition, maps of the ground water pollution potential using the DRASTIC method were prepared for Logan and Champaign counties.

The report includes the raw data collected, analysis of the data, results and discussion of the findings, and recommendations for management activities and future studies. In addition, the methodology used for this report will serve as a model for characterizing the hydrology of other similar outwash aquifer settings across the state of Ohio.

This 306 page report (including appendices) is available on a limited basis. Each report costs \$9.00 and can be purchased at or ordered from: The Ohio Department of Natural Resources, Division of Water, Water Resources Section, 1939 Fountain Square Court, Building E-1, Columbus, Ohio 43224-1336, Phone: (614) 265-6739.

Make checks payable to the ODNR-Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges shown below. Payments can also be made with Visa or MasterCard.

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| \$20.01 - \$50.00 | \$5.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

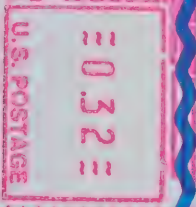
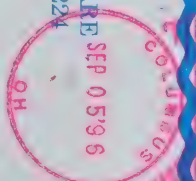
ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



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Aug 1996
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MONTHLY WATER INVENTORY REPORT FOR OHIO

August 1996

Compiled By David H. Cashell
 Hydrologist
 Water Inventory Unit

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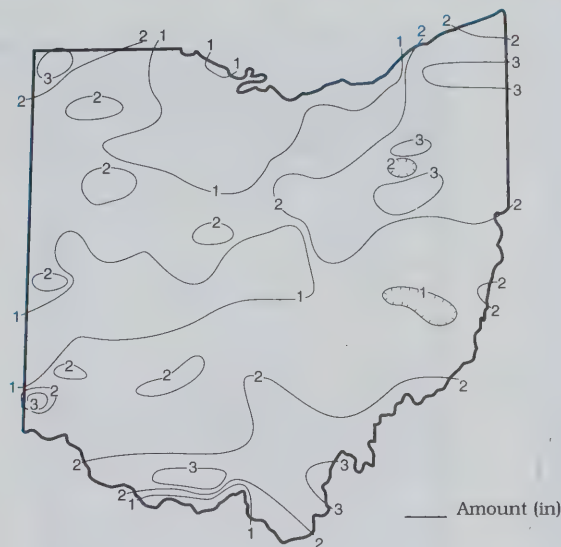
PRECIPITATION during August was below normal throughout most of the state with only a few scattered locations having above normal precipitation. The state average was 1.62 inches, 1.86 inches below normal. Regional averages ranged from 2.36 inches, 1.04 inches below normal, for the Northeast Region to 0.67 inch, 2.63 inches below normal, for the West Central Region. This was the driest August on record for the West Central Region and the second driest for the North Central Region. Shawnee State Forest (Scioto County) and Wingfoot Lake (Portage County) both reported the greatest amount of precipitation for the month, 3.72 inches. Dayton Municipal Airport (Montgomery County) reported the least amount of August precipitation, only 0.03 inch, its driest month on record. Other locations reporting less than 0.2 inch of precipitation in August were: New Carlisle and Springfield (Clark County); Troy and Tipp City (Miami County); Urbana (Champaign County); Fostoria and Tiffin (Seneca County); and Vermillion (Erie County).

Precipitation during August fell as scattered light showers and thunderstorms. The first week of the month was rather dry in most locations. During the second week, many locations received some rain during August 8-9 and also on August 12, especially in northeastern Ohio. Scattered storms moved across southern Ohio during August 15-16 and northern Ohio on August 20. Scattered showers continued throughout the August 22-26 period with some areas receiving much needed rain, but most areas missing the storms. The remainder of the month was rather dry in most locations.

Precipitation for the 1996 calendar year is above normal throughout the state. The state average is 31.95 inches, 4.95 inches above normal. Regional averages range from 40.10 inches, 11.11 inches above normal, for the Southwest Region to 24.31 inches, 0.37 inch above normal, for the Northwest Region.

Precipitation for the 1996 water year is above normal throughout the state. The state average is 41.09 inches, 6.52 inches above normal. Regional averages range from 49.77 inches, 12.59 inches above normal, for the Southwest Region to 32.09 inches, 1.12 inches above normal, for the Northwest Region.

PRECIPITATION AUGUST 1996

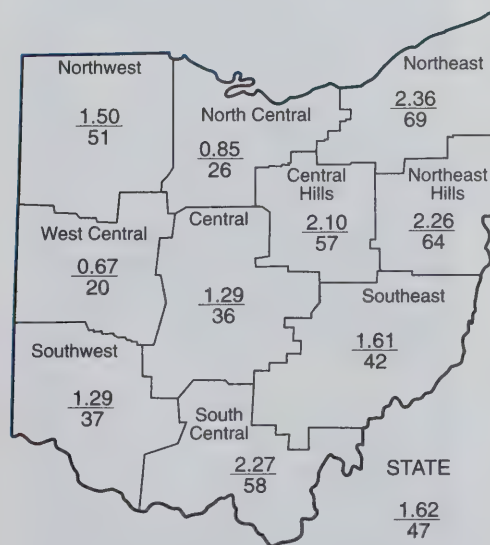


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -1.43 | -0.10 | +0.60 | -0.66 | -4.46 | -0.4 |
| North Central | -2.38 | -1.62 | +0.41 | +0.25 | +2.03 | -1.9 |
| Northeast | -1.04 | +0.79 | +3.42 | +5.56 | +3.50 | +0.5 |
| West Central | -2.63 | -0.90 | +4.68 | +5.82 | +7.57 | +1.4 |
| Central | -2.26 | -1.54 | +4.03 | +4.73 | +7.59 | +0.6 |
| Central Hills | -1.56 | -1.21 | +2.62 | +3.71 | +4.20 | +1.7 |
| Northeast Hills | -1.26 | +0.21 | +2.91 | +3.95 | +0.10 | +1.1 |
| Southwest | -2.18 | -0.24 | +10.88 | +11.10 | +11.24 | +1.6 |
| South Central | -1.62 | +0.09 | +5.36 | +6.25 | +4.84 | +1.5 |
| Southeast | -2.23 | -0.02 | +5.37 | +8.35 | +5.49 | +1.3 |
| State | -1.86 | -0.45 | +4.03 | +4.91 | +4.24 | |

*Above +4 = Extreme Moist Spell
 3.0 To 3.9 = Very Moist Spell
 2.0 To 2.9 = Unusual Moist Spell
 1.0 To 1.9 = Moist Spell
 0.5 To 0.9 = Incipient Moist Spell
 0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
 -1.0 To -1.9 = Mild Drought
 -2.0 To -2.9 = Moderate Drought
 -3.0 To -3.9 = Severe Drought
 Below -4.0 = Extreme Drought



Average (in)
 Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 84 | 75 | 110 | 121 | 128 |
| Great Miami River at Hamilton | 3,630 | 1,388 | 150 | 237 | 193 | 177 |
| Huron River at Milan | 371 | 35 | 73 | 139 | 154 | 130 |
| Killbuck Creek at Killbuck | 464 | 186 | 145 | 185 | 163 | 148 |
| Little Beaver Creek near East Liverpool | 496 | 84 | 81 | 145 | 121 | 123 |
| Maumee River at Waterville | 6,330 | 1,770 | 265 | 262 | 137 | 112 |
| Muskingum River at McConnelsville | 7,422 | 2,723 | 103 | 174 | 148 | 140 |
| Scioto River near Prospect | 567 | 50 | 123 | 155 | 137 | 153 |
| Scioto River at Higby | 5,131 | 2,183 | 186 | 264 | 192 | 178 |
| Stillwater River at Pleasant Hill | 503 | 64 | 109 | 184 | 155 | 156 |

STREAMFLOW during August was above normal throughout most of the state, but below normal in north-central and north-eastern Ohio. Flows in some basins in northwestern Ohio were high enough to be considered excessive. Flows during August were seasonally less than the flows during July.

Flows at the beginning of the month were noticeably above normal throughout the state, a significant contributing factor for flows being above normal during August. Generally, flows declined throughout the month with only small rises noted following local precipitation. Nearly all basins had their greatest flows for August on the first day of the month. Exceptions were in some basins in northeastern Ohio where the month's greatest flows occurred during August 9-11

following precipitation that fell during August 8-9. Lowest flows for August occurred at the end of the month in nearly all drainage basins and were noticeably below normal statewide at this time.

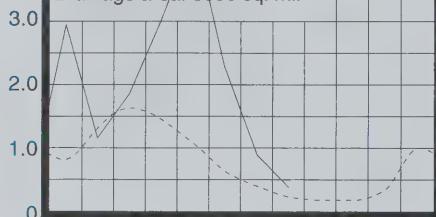
RESERVOIR STORAGE during August declined in both the Mahoning and Scioto river basins. Storage remained above normal in the Mahoning basin reservoirs but fell to the seasonal normal in the Scioto basin reservoirs.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with 92 percent for last month and 84 percent for August 1995. Month-end storage in the Scioto basin index reservoirs was 81 percent of rated capacity for water supply compared with 94 percent for last month and 95 percent for August 1995. Surface water supplies continue to remain adequate throughout the state.

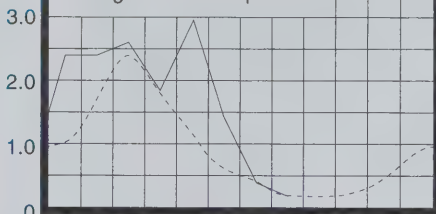
MEAN STREAM DISCHARGE

(4.81-Off the chart)

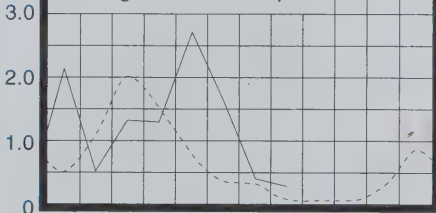
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



(4.86 - Off the chart)

SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.

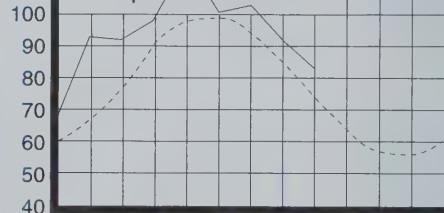


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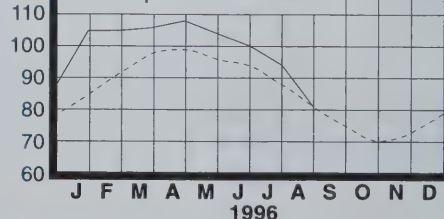
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



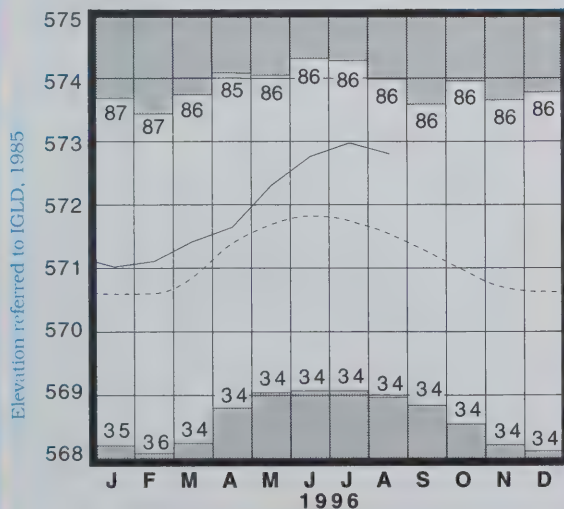
GROUND WATER LEVELS during August declined seasonally in all aquifers statewide. Net changes during August from last month's levels ranged from about the same to twice that usually observed with the greatest net changes occurring in unconsolidated aquifers. Generally, ground water levels declined steadily throughout the month in all aquifers.

Ground water supplies continue to remain adequate throughout the state. Current levels range from about the same to nearly one foot higher than they were a year ago. Levels in most aquifers are above normal, but a few aquifers in some eastern areas of the state have slightly below normal levels. Ground water levels can be expected to continue to decline during the next few months, typically the driest period of the year, unless precipitation is notably above normal. The below normal precipitation during August in many areas of Ohio resulted in soil moisture being reduced considerably as compared to a month ago. The Ohio Agricultural Statistics Service reports that at the end of August, soil moisture was rated as being short or very short in 69 percent of the state and adequate in 31 percent of the state.

LAKE ERIE level declined during August. The mean level was 572.80 feet (IGLD-1985), 0.17 foot below last month's mean level and 1.24 feet above normal. This month's level is 0.56 foot above the August 1995 level and 3.60 feet above Low Water Datum

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during August averaged 1.1 inches, 2.1 inches below normal. The entire Great Lakes basin averaged 2.0 inches of precipitation during August, 1.1 inches below normal. For calendar year 1996 through August, the Lake Erie basin has averaged 24.2 inches of precipitation, 0.6 inch above normal and the entire Great Lakes basin has averaged 22.9 inches, 1.9 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

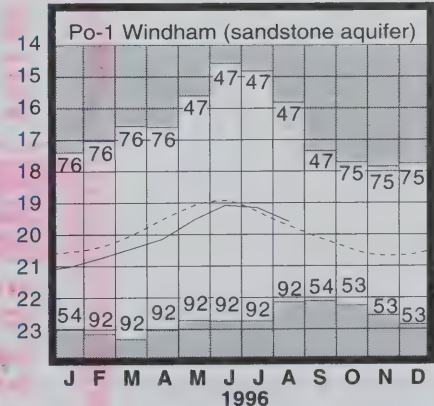
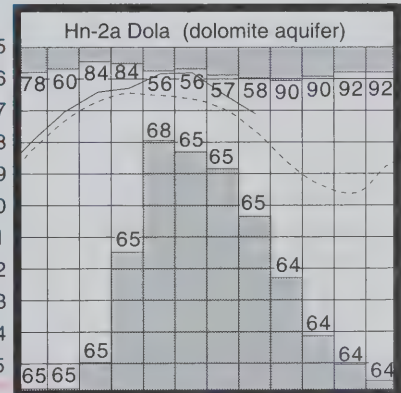
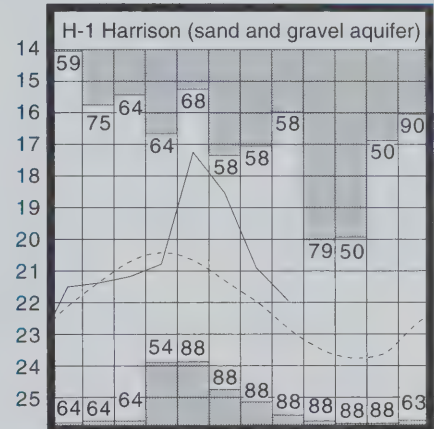
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.09 | +0.07 | -0.41 | +0.34 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.99 | +0.29 | -0.72 | -0.01 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.29 | +1.73 | -0.92 | +0.56 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.95 | +0.86 | -1.05 | +0.35 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.11 | +0.55 | -0.61 | +0.03 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.60 | +0.12 | -0.44 | +0.80 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.89 | -0.80 | -1.14 | +0.90 |

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was below normal throughout most of Ohio and exceptually below normal in some west-central and north-central areas of the state. This was the driest August on record for the West Central Region and the second driest for the North Central Region. Streamflow was above normal in all but northeastern Ohio as the result of noticeably above normal flows at the beginning of the month. Reservoir storage declined and remained at or above normal seasonal levels. Ground water levels in all aquifers declined throughout the month. Lake Erie level declined 0.17 foot and was 1.24 feet above the long-term August average.

NOTES AND COMMENTS

OWWA ANNUAL CONVENTION

The Ohio Water Well Association (OWWA) will hold its 1996 annual convention November 21-22 at the Columbus Marriott North. Presentations during the two-day event will cover various topics including equipment maintenance, changes in PUCO and worker's compensation rules, and small business management.

Many other activities are also planned for both the convention attendees and their spouses. A silent auction will be held with all proceeds going to support the OWWA scholarship fund. For more information, contact: Dan Schlosser, OWWA Executive Director, P.O. Box 310, Caledonia, Ohio 43314, phone: (419) 845-2023, fax: (419) 845-2026.

WMAO ANNUAL CONFERENCE

The Water Management Association of Ohio (WMAO) will hold its 25th annual conference November 13-14 at the Columbus Clarion Hotel. Attendees will be updated on many legislative changes and current activities of each of the divisions within WMAO. Additional presentations will cover flood warning, control, protection, and mitigation activities, and water quality, ground water, and watershed management and characterization projects.

At the conference, the Ohio Floodplain Management Association and the Ohio Dam Safety Organization will also hold concurrent meetings. An awards ceremony will recognize WMAO members who have made significant contributions to the water field during the past year and/or throughout their careers and also to high school students who were presented the Water Management Award at the State Science Day competition in April.

For more information, contact: Helen Sedoris at (614) 728-8575 or write to WMAO, 262 Agricultural Engineering Building, 590 Woody Hayes Drive, Columbus, Ohio 43210.

WATER WITHDRAWAL 1995 ANNUAL REPORT AVAILABLE

The "Ohio Water Withdrawal Facility Registration Program: 1995" annual report pamphlet is now available. This four-page report depicts on a statewide basis the amount of water withdrawn by registered facilities in 1995. It also details on a county basis the water withdrawals for each of the five reporting categories. Those categories are: power; public water supply; industrial; agriculture/irrigation (includes golf courses); and miscellaneous.

Owners of all facilities (surface and/or ground water) with the capacity to withdraw 100,000 gallons of water or more per day are required to register that facility with the ODNR Division of Water and submit annual reports of actual withdrawals pursuant to Section 1521.16 of the Ohio Revised Code. Copies of the 1995 annual report are available from the Ohio Department of Natural Resources, Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224-1336, phone: (614) 265-6735.

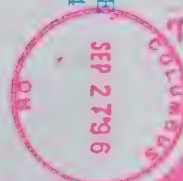
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servancy District: U.S. Army Corps of Engi-
neers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources
Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National
Oceanic and Atmospheric Administration,
National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



George V. Voinovich
Governor

Donald C. Anderson
Director

Michelle Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1996

Compiled By David H. Cashell

Hydrologist

Water Inventory Unit

PRECIPITATION during September was above normal throughout most of the state with only the Northwest Region having slightly below normal precipitation. The state average was 5.68 inches, 2.68 inches above normal, which ranks as the second wettest September during the past 114 years. Regional averages ranged from 8.23 inches, 5.05 inches above normal, for the Northeast Region to 2.81 inches, 0.04 inch below normal, for the Northwest region. This was the wettest September on record for the Northeast and North Central regions and the second wettest for the Central Hills Region. Painesville (Lake County) reported the greatest amount of precipitation for the month, 12.26 inches. Other locations in Ashtabula, Cuyahoga, and Lorain counties reported more than 11 inches of precipitation during September. Paulding (Paulding County) reported the least amount of September precipitation, 1.66 inches; Defiance (Defiance County) reported 1.88 inches, the only other location reporting less than 2 inches of precipitation during September.

Precipitation fell during every week of September. The dry conditions of August continued during the first several days of September, but by the end of the first week rains returned to many areas of the state. The remnants of Hurricane Fran passed through the eastern half of the state during September 6-7 dropping about 0.5 inch of rain in most locations; however, some areas received more than 1 inch, and in northeastern Ohio, amounts of more than 5 inches were reported. Widely scattered, light showers continued off and on during the second week of the month with most areas receiving up to 0.5 inch of rain during the period, but in northeastern Ohio amounts of more than 1 inch were reported during September 11-13. Heavier storms crossed the state during September 16-17 during which time many areas in the southern half of the state received nearly 2 inches of rain. Scattered showers with 0.5 inch rain totals fell throughout the state during September 21-22. Widespread, soaking rains fell statewide during September 27-28 with amounts of 1 to more than 2 inches of rain reported in most areas.

Precipitation for the 1996 calendar year is above normal throughout the state. The state average is 37.51 inches, 7.51 inches above normal. Regional averages range from 45.76 inches, 13.68 inches above normal, for the Southwest Region to 26.84 inches, 0.05 inch above normal, for the Northwest Region.

Precipitation for the 1996 water year was noticeably above normal throughout the state with only a few locations in northwestern Ohio having below normal precipitation. The state average was 46.69 inches, 9.12 inches above normal. Regional averages ranged from 55.43 inches, 15.16 inches above normal, for the Southwest Region to 34.63 inches, 0.81 inch above normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Andover (Ashtabula County) reported the greatest amount of precipitation for the water year, 67.93 inches; Cincinnati-Fernbank (Hamilton County) reported the second greatest amount, 65.83 inches. Hicksville (Defiance County) reported the least amount of water year precipitation, 28.95 inches; Bowling Green (Wood County) and Toledo Express Airport (Lucas County) also reported less than 30 inches of precipitation for the water year. An isohyetal map and regional averages with percentages of normal precipitation for the 1996 water year appear on the back page.

(continued on back)

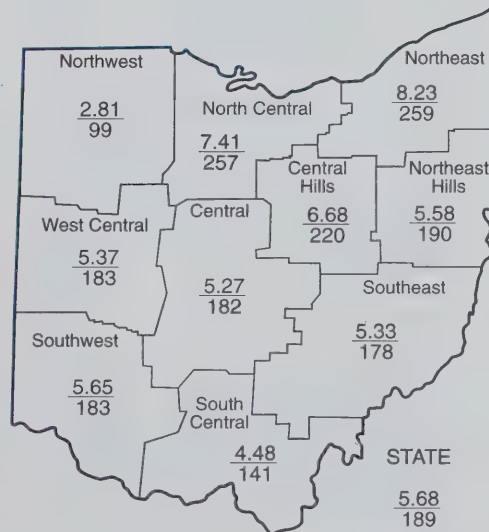
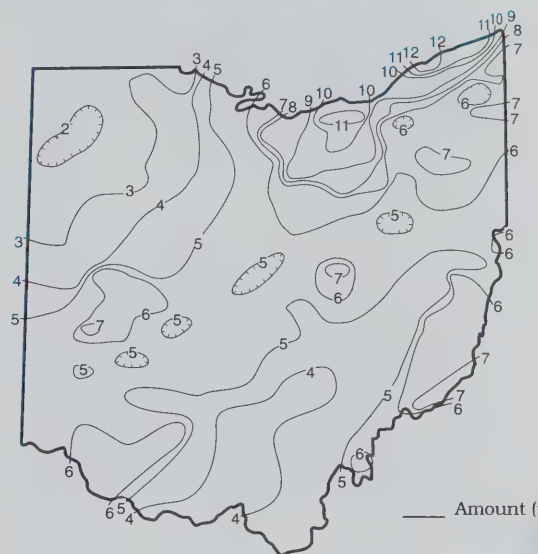
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.04 | -1.00 | +0.85 | +0.81 | -2.85 | +0.4 |
| North Central | +4.53 | +2.16 | +5.17 | +6.37 | +7.51 | +2.6 |
| Northeast | +5.05 | +4.09 | +8.62 | +12.36 | +9.07 | +4.1 |
| West Central | +2.44 | +1.41 | +7.89 | +9.62 | +11.32 | +2.7 |
| Central | +2.38 | +0.84 | +7.26 | +9.20 | +11.55 | +3.2 |
| Central Hills | +3.65 | +1.60 | +6.67 | +9.53 | +9.37 | +4.3 |
| Northeast Hills | +2.64 | +1.12 | +5.74 | +8.02 | +3.32 | +3.1 |
| Southwest | +2.56 | +0.66 | +13.25 | +15.16 | +15.68 | +3.9 |
| South Central | +1.30 | +0.18 | +6.72 | +8.65 | +6.66 | +2.7 |
| Southeast | +2.34 | +1.49 | +6.40 | +11.28 | +8.00 | +3.2 |
| State | +2.68 | +1.26 | +6.86 | +9.12 | +8.00 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION SEPTEMBER 1996

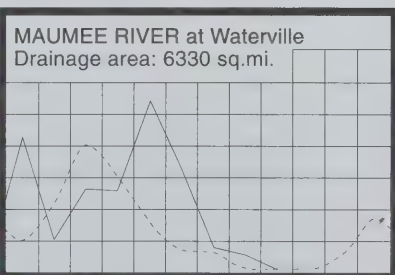
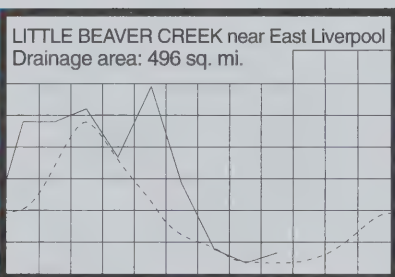
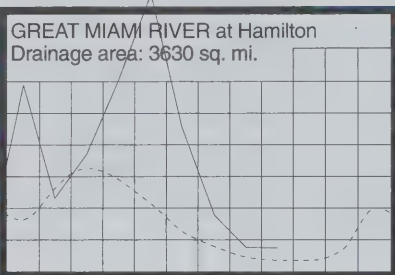


Average (in)
Percent of normal

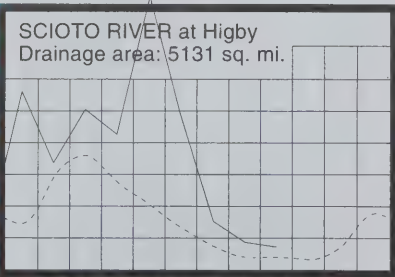
| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 753 | 338 | 102 | 146 | 134 |
| Great Miami River at Hamilton | 3,630 | 1,336 | 174 | 166 | 227 | 178 |
| Huron River at Milan | 371 | 124 | 337 | 98 | 176 | 133 |
| Killbuck Creek at Killbuck | 464 | 291 | 288 | 152 | 179 | 152 |
| Little Beaver Creek near East Liverpool | 496 | 169 | 184 | 94 | 129 | 125 |
| Maumee River at Waterville | 6,330 | 466 | 73 | 125 | 145 | 113 |
| Muskingum River at McConnelsville | 7,422 | 2,833 | 144 | 98 | 151 | 141 |
| Scioto River near Prospect | 567 | 56 | 182 | 152 | 190 | 153 |
| Scioto River at Higby | 5,131 | 1,829 | 150 | 151 | 226 | 179 |
| Stillwater River at Pleasant Hill | 503 | 57 | 115 | 136 | 193 | 156 |

MEAN STREAM DISCHARGE

(4.81-Off the chart)



(4.86 - Off the chart)



Base period for all streams: 1961-1990

Ohio had their highest flows for the month on September 7 following this rain. The remaining drainage basins had their greatest flows for September just before the end of the month following widespread showers and soaking rains during September 27-29. Flows at the end of the month were noticeably above normal throughout the state.

Streamflow for the 1996 water year was noticeably above normal throughout the state (see Mean Stream Discharge table, percent of normal, past 12 months column). The preliminary annual mean daily discharge of 8,415 cfs for the Scioto River at Higby gauging station was the highest for its period of record, and for the Great Miami River at Hamilton gauging station, 5,865 cfs was its second highest annual mean daily flow, trailing only the annual flow for 1913, the year of the Great Flood.

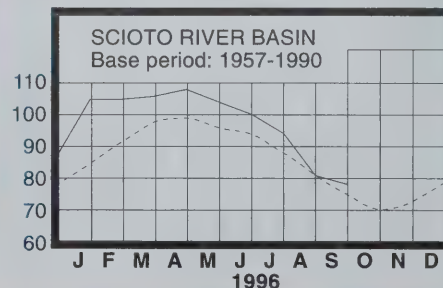
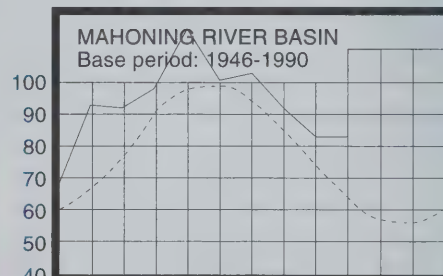
Streamflow during the 1996 water year was generally above normal during nearly every month with only December 1995 having below normal flows statewide. Flooding occurred during January and during the late spring and early summer months. The January flooding was caused by rapid snowmelt and rain falling on frozen ground. The counties that border the Ohio River were the most severely impacted. Much of the runoff came from the drainage area of the Ohio River in Pennsylvania. The flooding during April, May, and June was caused by heavy rain showers and locally severe thunderstorms throughout the period. Soils were at or near moisture retention capacities thus resulting in increased runoff. Many locations had record or near-record May flows.

RESERVOIR STORAGE in September was unchanged in the Mahoning, and declined slightly in the Scioto basin reservoirs. Storage was above normal in both basins.

Reservoir storage at the end of September in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with the same for last month and 75 percent for September 1995. Month-end storage in the Scioto basin index reservoirs was 78 percent of rated capacity for water supply compared with 81 percent for last month and 86 percent for September 1995.

The 1996 water year was very good for surface water supplies. Storage in both on- and off-stream reservoirs was generally above normal throughout the year. Recreational reservoirs easily maintained summer pool levels, but during the winter and spring months high water levels were a nuisance in many areas as flood-control reservoirs often needed to utilize available storage. Some reservoirs in the lower Scioto River basin reached record or near-record levels during May.

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS during September declined throughout the state. Net changes during September from last month's levels were greater than usually observed. Generally, ground water levels in all aquifers declined steadily throughout the month still responding to the noticeably below normal precipitation during August. Levels in some shallow unconsolidated aquifers began to rise just before the end of the month in response to widespread showers and soaking rains.

Ground water supplies continue to remain adequate throughout the state. Current levels are generally higher than they were a year ago in most areas of the state, but slightly lower in some consolidated aquifers. Most aquifers continue to have above normal seasonal levels, but in some aquifers in the eastern areas of the state levels have fallen to slightly below normal. The above normal precipitation during September improved the soil moisture conditions across the state greatly. The Ohio Agricultural Statistics Service reports that at the end of September, soil moisture was rated as being short in 6 percent of the state, adequate in 83 percent of the state and surplus in 11 percent of the state.

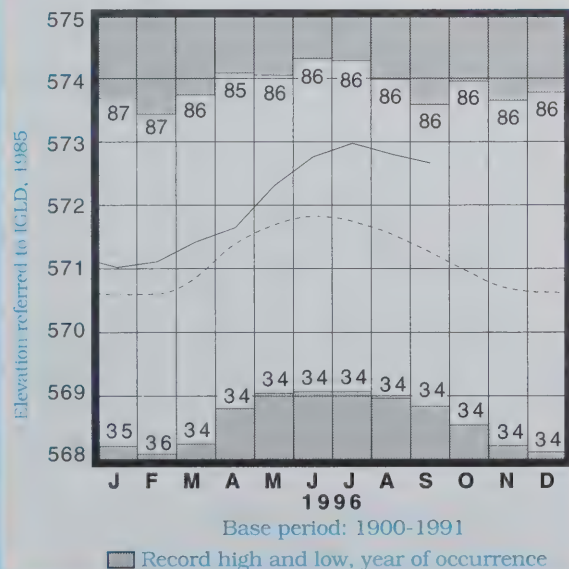
The ground water supply situation improved considerably during the 1996 water year. The water year started off with ground water levels just beginning to recover from unusually dry conditions during late 1994 and early 1995 when below normal precipitation resulted in very little recharge to ground water supplies. Ground water levels in the eastern half of the state were the most severely impacted and remained at below normal levels through the spring of 1996. Significant recharge to ground water supplies started after the January thaw when snowmelt and rain combined to produce high-water conditions in many areas of the state. Although ground water levels in aquifers in the eastern half of Ohio remained below normal, they were well on their way to recovery after this time. Additional recharge continued through the middle of June as the late spring months were unusually wet. By early summer, ground water levels throughout the state had finally recovered to near or above normal levels. Ample precipitation during the summer months reduced demand, and although August was very dry, ground water supplies continued to remain in good condition. Seasonal declines in ground water levels during September, enhanced by the lack of August precipitation, have not had a serious adverse effect on ground water supplies. At the end of the 1996 water year, ground water supplies are in good condition throughout the state. The prognosis appears to be favorable for the upcoming recharge period.

LAKE ERIE level declined during September. The mean level was 572.67 feet (IGLD-1985), 0.13 foot below last month's mean level and 1.41 feet above normal. This month's level is 0.95 foot above the September 1995 level and 3.47 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during September averaged 7.8 inches, 4.7 inches above normal. The entire Great Lakes basin averaged 4.8 inches of precipitation during September, 1.4 inches above normal. For calendar year 1996 through September, the Lake Erie basin has averaged 32.0 inches of precipitation, 5.3 inches above normal and the entire Great Lakes basin has averaged 27.7 inches, 3.3 inches above normal.

Lake Erie remained above the long-term average level throughout the 1996 water year. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the next several months.

LAKE ERIE LEVELS at Fairport



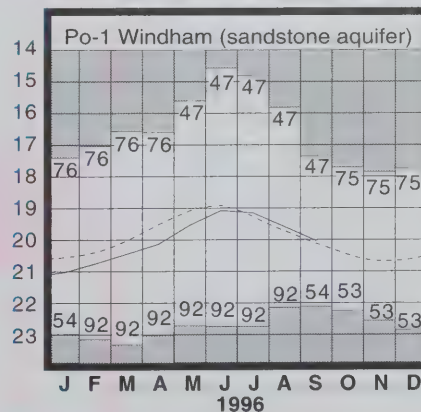
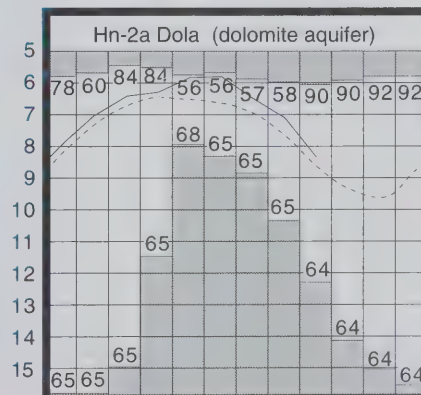
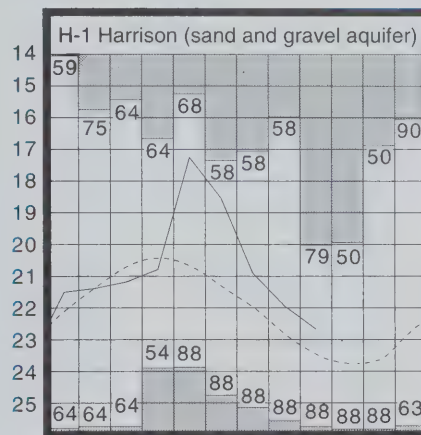
GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 16.96 | -0.54 | -1.87 | -0.28 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.84 | -0.17 | -0.85 | -0.37 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.89 | +1.61 | -0.60 | +0.64 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.68 | +0.79 | -0.73 | +0.61 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 8.35 | +0.26 | -1.24 | +0.08 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.03 | +0.09 | -0.43 | +0.64 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.55 | -1.04 | -0.66 | +0.98 |

GROUND-WATER LEVELS

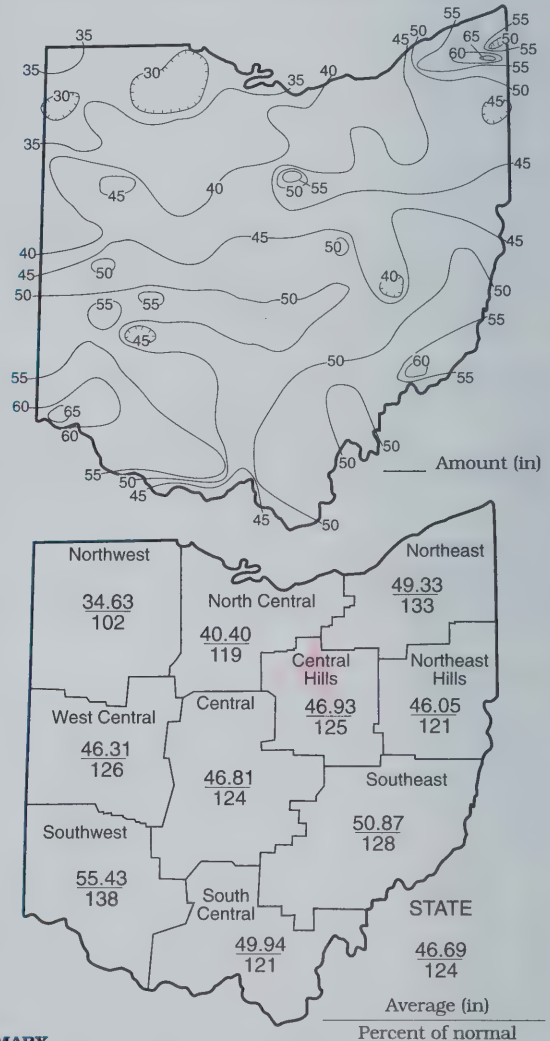
Water level (ft below land surface)



(continued from front page)

The 1996 water year was good for water supplies across Ohio, but unfortunately also included serious flooding events and considerable delays in many spring agricultural activities. The water year started off with above normal precipitation statewide with heavy rains early in October closely followed by the passage of Hurricane Opal's remnants. Precipitation during November continued to be above normal in the northern half of the state, but was below normal in the southern half. Precipitation was below normal statewide during December. Much of Ohio had noticeably above normal snow during the first half of January which melted quickly after mid-month as temperatures warmed and rain fell throughout the state. Flooding of low-lying areas occurred statewide with counties bordering the Ohio River severely impacted. February precipitation was above normal in eastern Ohio, but below normal in western Ohio. March precipitation was below normal throughout the state except in a small area of southwestern Ohio. Then the rains began. April was the sixth wettest on record, May was the fifth wettest, June precipitation was noticeably above normal throughout much of the state and July precipitation was above normal except in a few areas of northeastern Ohio. Conditions started to change during the second half of July and quickly did an about face as August was unusually dry. The west-central and north-central areas of the state experienced record or near-record dryness in August. September precipitation returned to the earlier pattern being the second wettest on record.

Total Precipitation 1996 Water Year



SUMMARY

Precipitation for September was noticeably above normal throughout most of the state with only the Northwest Region having slightly below normal precipitation. This was the second wettest September on record for the state as a whole. Streamflow was above normal except in northwestern Ohio drainage basins. Reservoir storage was about the same as last month and remained above normal. Ground water levels declined and are above normal in most areas of the state, but slightly below normal in some eastern Ohio aquifers. Lake Erie level declined and was 1.41 feet above the long-term September average.

Precipitation for the 1996 water year was noticeably above normal throughout most of the state. Streamflow was above normal statewide and at or near record levels in south-central and southwestern Ohio. Reservoir storage was above normal throughout the water year. Ground water levels improved considerably during the water year. Lake Erie remained above the long-term average throughout the water year. The 1996 water year was good for water supplies, but also included serious flooding and considerable delays in spring agricultural activities.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



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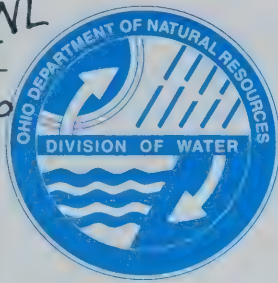
Michele Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

October 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

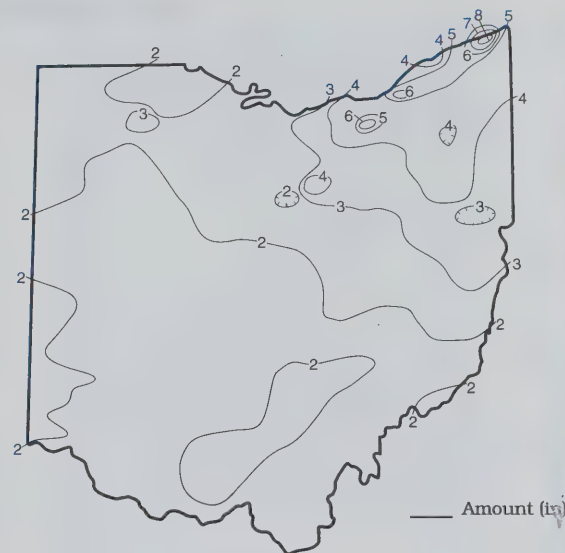
PRECIPITATION during October was below normal throughout most of Ohio, but above normal in the northeastern area of the state. The state average was 2.42 inches, 0.08 inch above normal. Regional averages ranged from 4.41 inches, 1.69 inches above normal, for the Northeast Region to 1.52 inches, 0.82 inch below normal, for the West Central Region. Ashtabula (Ashtabula County) reported the greatest amount of precipitation for the month, 8.17 inches. On October 19, 20, and 21, Ashtabula reported 1.82 inches, 1.70 inches, and 1.37 inches of precipitation, respectively. Ripley (Brown County) reported the least amount of October precipitation, only 1.00 inch.

Precipitation during October fell entirely as rain with most falling during the second half of the month. The only notable precipitation during the first half of October fell during October 9-10. Amounts approaching 1 inch were recorded in northeastern Ohio, tapering off to less than 0.25 inch in the southwestern and south-central areas of the state during this period. The greatest precipitation for the month fell during October 17-19. The western half of the state received less than 1 inch of rain during this period, but some areas in northeastern Ohio reported more than 2 inches. Scattered, light showers crossed the state throughout the last 10 days of the month. Most areas received around 0.5 inch of rain during this period. The exception was once again in northeastern Ohio where around 1 inch was received during this period with 0.5 inch falling on October 29 alone.

Precipitation for the 1996 calendar year is above normal throughout most of the state with only the Northwest Region having slightly below normal precipitation. The state average is 39.93 inches, 7.59 inches above normal. Regional averages range from 47.46 inches, 12.99 inches above normal, for the Southwest Region to 28.92 inches, 0.16 inch below normal, for the Northwest Region. Most areas of the state have already received more than their average annual precipitation.

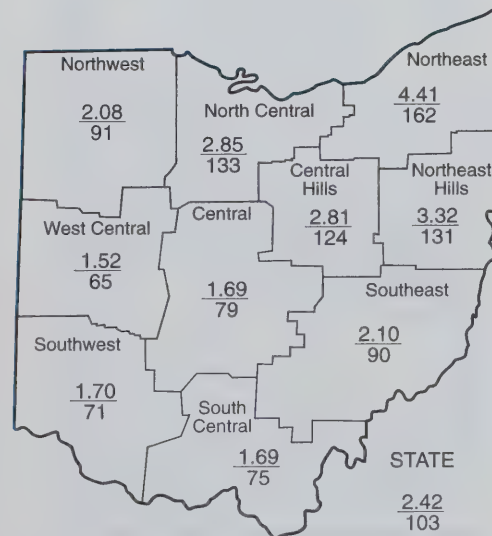
The 1997 water year (October 1, 1996 to September 30, 1997) is not off to an exceptionally good start as far as precipitation is concerned. Even with the below normal precipitation during October, conditions favor a good recharge period provided climatic conditions are near normal during the next several months.

PRECIPITATION OCTOBER



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.21 | -1.68 | +0.07 | -1.19 | -1.66 | -0.4 |
| North Central | +0.71 | +2.85 | +3.78 | +5.26 | +9.68 | +3.2 |
| Northeast | +1.69 | +5.70 | +8.01 | +11.74 | +12.01 | +4.9 |
| West Central | -0.82 | -1.03 | +3.81 | +6.60 | +12.14 | +1.6 |
| Central | -0.45 | -0.30 | +4.28 | +6.72 | +12.48 | +2.9 |
| Central Hills | +0.55 | +2.55 | +4.48 | +7.52 | +11.43 | +4.2 |
| Northeast Hills | +0.79 | +2.17 | +5.30 | +6.86 | +5.86 | +2.9 |
| Southwest | -0.69 | -0.30 | +7.76 | +12.37 | +16.41 | +4.2 |
| South Central | -0.55 | -0.74 | +5.41 | +6.56 | +7.39 | +1.5 |
| Southeast | -0.23 | -0.21 | +5.58 | +8.99 | +9.24 | +3.2 |
| State | +0.08 | +0.90 | +4.85 | +7.17 | +9.54 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,222 | 349 | 158 | 162 | 143 |
| Great Miami River at Hamilton | 3,630 | 1,079 | 142 | 129 | 259 | 175 |
| Huron River at Milan | 371 | 96 | 285 | 160 | 207 | 134 |
| Killbuck Creek at Killbuck | 464 | 328 | 329 | 231 | 246 | 155 |
| Little Beaver Creek near East Liverpool | 496 | 286 | 238 | 154 | 167 | 128 |
| Maumee River at Waterville | 6,330 | 602 | 99 | 108 | 205 | 112 |
| Muskingum River at McConnelsville | 7,422 | 4,082 | 217 | 141 | 188 | 143 |
| Scioto River near Prospect | 567 | 46 | 166 | 86 | 228 | 151 |
| Scioto River at Higby | 5,131 | 2,181 | 236 | 148 | 285 | 178 |
| Stillwater River at Pleasant Hill | 503 | 60 | 101 | 89 | 226 | 152 |

STREAMFLOW during October was above, normal throughout most of Ohio with only the northwestern area of the state having slightly below normal flows. Flows in eastern, north-central, and south-central Ohio were high enough to be considered excessive. Flows during October were greater than the flows during September in many areas of the state, but less in north-central and southwestern Ohio.

Flows at the beginning of the month were noticeably above normal throughout the state. Some drainage basins in the southern half of the state had their greatest flows for October at the beginning of the month with these flows still responding to widespread showers and soaking rains just prior to the end of September. Generally, flows declined through mid-month with a few days of slight increases noted after October 9.

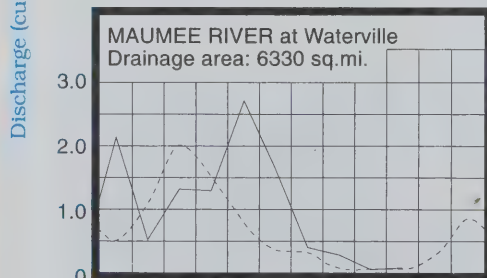
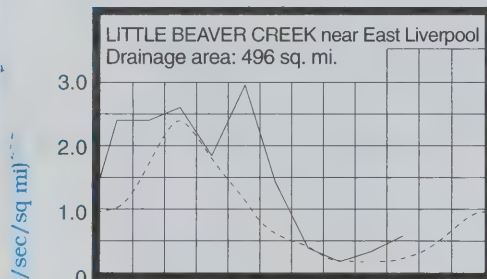
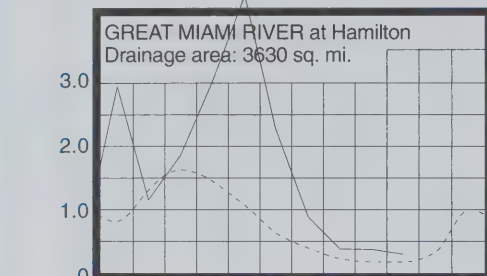
A few drainage basins in extreme north-central and northeastern Ohio had their lowest October flows during October 8-9, but most other basins recorded their lowest flows just after the middle of the month. Flows increased rapidly following the month's greatest precipitation on October 17-18. The greatest flows for the month in most basins occurred during October 19-20 following these rains. Flows at the end of the month remained noticeably above normal throughout the state.

RESERVOIR STORAGE for water supply during October was unchanged in the Mahoning basin reservoirs and declined in the Scioto basin reservoirs. Month-end storage was noticeably above normal in the Mahoning basin and slightly below normal in the Scioto basin.

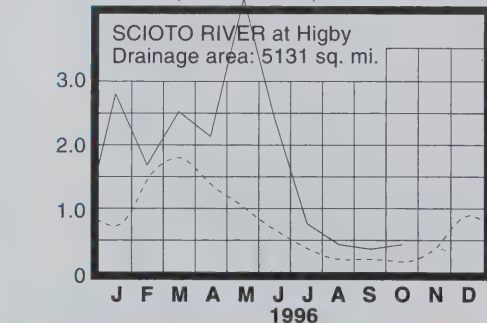
Reservoir storage at the end of October in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with the same for last month and 69 percent for October 1995. Month-end storage in the Scioto basin index reservoirs was 69 percent of rated capacity for water supply compared with 78 percent for last month and 83 percent for October 1995. Surface water supplies remain in good condition throughout the state.

MEAN STREAM DISCHARGE

(4.81-Off the chart)



(4.86 - Off the chart)

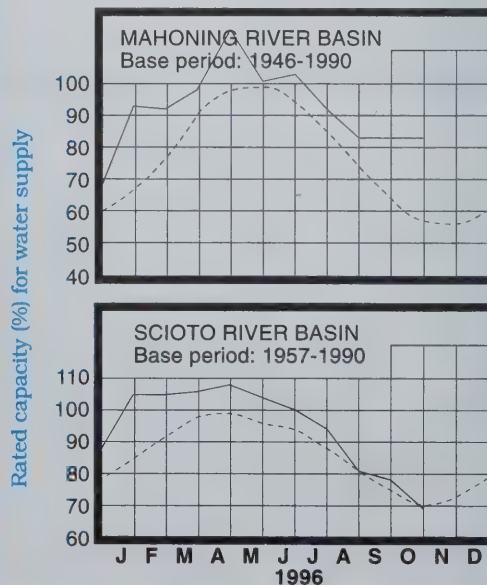


Base period for all streams: 1961-1990

Normal

Current

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.89 | -1.00 | -0.93 | +0.10 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 9.57 | -0.56 | -0.73 | -1.24 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.97 | +1.47 | -0.08 | +0.39 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.74 | +1.02 | -0.06 | +0.87 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 9.72 | -0.39 | -1.37 | -0.34 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.22 | +0.25 | -0.19 | +0.85 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.65 | -1.04 | -0.10 | +1.27 |

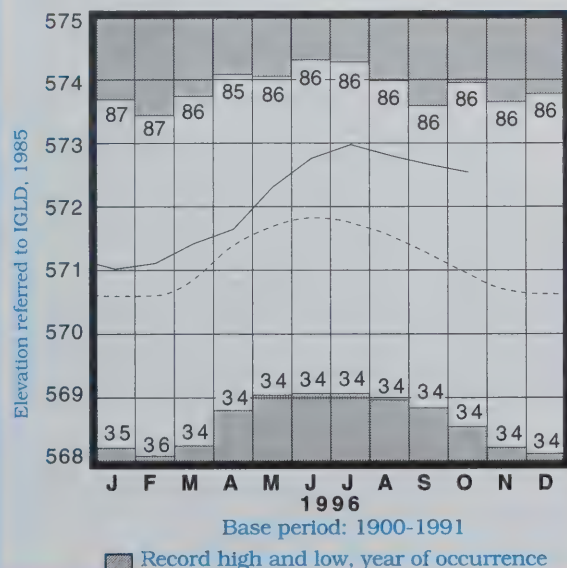
GROUND-WATER LEVELS during October declined seasonally in all aquifers throughout the state. Generally, net changes during October from last month's levels were greater than usually observed in consolidated aquifers and less than usually observed in unconsolidated aquifers. Levels in most aquifers declined steadily throughout the month, but in some aquifers, especially shallow unconsolidated aquifers, levels rose for a week or so after October 17 responding the month's greatest precipitation.

Ground water supplies continue to remain adequate throughout the state. Current levels are generally higher than they were a year ago in most aquifers, but slightly lower in some consolidated aquifers in the western half of the state. Ground water levels range from about 1 foot below to 1.5 feet above normal across the state. Generally, levels in consolidated aquifers are below normal and levels in unconsolidated aquifers are above normal. Ground water supplies are in a favorable position as the 1997 water year recharge season approaches. The Ohio Agricultural Statistics Service reports that at the end of October, soil moisture was rated as being adequate in 81 percent of the state, surplus in 14 percent of the state, and short in 5 percent of the state. These conditions favor improvement in ground water storage provided climatic conditions are near normal during the next several months.

LAKE ERIE level declined during October. The mean level was 572.54 feet (IGLD-1985), 0.13 foot below last month's mean level and 1.58 feet above normal. This month's level is 1.05 feet above the October 1995 level and 3.34 feet above Low Water Datum.

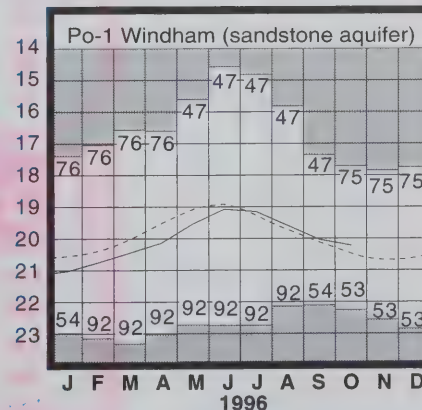
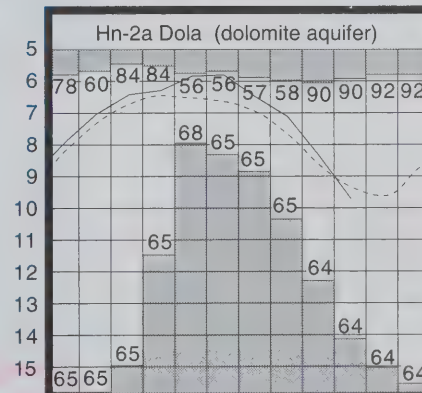
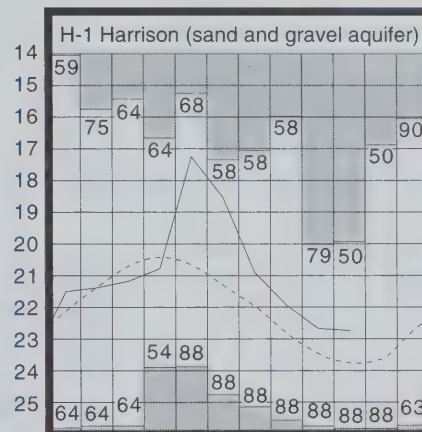
The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during October averaged 3.3 inches, 0.5 inch above normal. The entire Great Lakes basin averaged 3.4 inches of precipitation during October, 0.6 inch above normal. For calendar year 1996 through October, the Lake Erie basin has averaged 35.4 inches of precipitation, 5.9 inches above normal, and the entire Great Lakes basin has averaged 31.1 inches, 3.9 inches above normal.

LAKE ERIE LEVELS at Fairport



GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.
Po-1, 1947-1990

SUMMARY

Precipitation was below normal in southern and western Ohio, but above normal in the northeastern area of the state. Streamflow was noticeably above normal throughout most of the state. Reservoir storage was unchanged in the Mahoning basin reservoirs and declined in the Scioto basin reservoirs. Reservoir storage was near or above the normal seasonal levels. Ground water levels declined throughout the state. Lake Erie level declined 0.13 foot and was 1.58 feet above the long-term October average.

NOTES AND COMMENTS

NEW PUBLICATION

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Clermont County, Ohio

by The Center for Ground Water Management, Wright State University, in cooperation with the Ohio Department of Natural Resources, Division of Water

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.50 |
| \$10.01 - \$20.00 | \$3.75 |
| \$20.01 - \$50.00 | \$6.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

ORIGINATOR OF "MONTHLY WATER INVENTORY REPORT" PASSES

It is with sad contemplation that we report the passing of Paul Kaser on October 29, 1996. Paul began working as a hydrologist in the Division of Water after its creation within ODNR in 1949. Prior to that, he worked for the Ohio Water Resources Board. Paul was instrumental in developing and managing the observation well/ground water level monitoring program in Ohio for many years. He authored several reports that presented and analyzed the data from this statewide network.

In 1954, Paul conceived the idea to publish a monthly report that presented in brief form hydrologic data from across the state that were sufficiently representative of current water conditions to permit an evaluation of the statewide water supply situation. This idea became the "Monthly Water Inventory Report for Ohio" which has been published by the Division of Water for more than 42 years. Paul was the author of this report for more than 22 years.

Paul retired from the Division of Water in the early 1970s. He was especially proud of his fellowship with the Ohio Academy of Science. He resided in Scottsdale, Arizona during most of his retirement before moving to Tucson for the past few years. He was laid to rest near his hometown of Killbuck, Ohio.

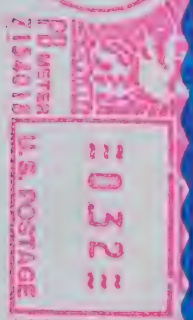
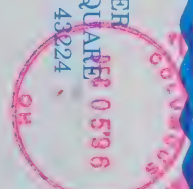
ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



George V. Voinovich
Governor

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MONTHLY WATER INVENTORY REPORT FOR OHIO

November 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit



PRECIPITATION during November was above normal throughout Ohio. The state average was 3.43 inches, 0.78 inch above normal. Regional averages ranged from 4.30 inches, 1.42 inches above normal, for the Northeast Region to 2.97 inches, 0.54 inch above normal, for the North Central Region. Andover (Ashtabula County) reported the greatest amount of precipitation for the month, 7.58 inches; Chardon (Geauga County) reported 7.36 inches. Sandusky (Erie County) reported the least amount of November precipitation, 1.94 inches, the only location reporting less than two inches for the month.

Precipitation during November fell as both rain and snow with temperatures averaging well below normal throughout the state. The first week of the month was rather dry with only a few scattered sprinkles falling around the state. Conditions began to change after November 7 as a slow moving storm system brought rain showers to most of the state. Most areas of the state received around 1 inch of rain with amounts of 1.5 inches reported in portions of northwestern and southeastern Ohio. As this storm system moved northeastward, colder air moved into the state. By November 9 significant lake-effect snows were falling in northeastern Ohio. Snow squalls continued on and off for the next several days. By the time the storm ended, near-record snow accumulations were reported in Cleveland's eastern suburbs and the snow-belt portions of Ashtabula, Lake, and Geauga counties. Snow amounts of 1.5 to 3 feet were common with some areas reporting from 4 to more than 5 feet of snow. The greatest amount reported was 68.9 inches in Geauga County, Hambden Township, which is several miles east of Chardon. Chardon reported 53.6 inches of snow for the month, about 42 inches above normal. The snowiest month of record for Chardon was December 1962 when 69.5 inches of snow fell. The heavy, wet snow caused considerable damage to power distribution lines and many of the hardest hit areas were without electricity for several days. Fortunately, the melt was slow enough to not cause any significant flooding problems.

The middle of the month was rather dry with most locations reporting up to only a 0.5 inch or so of total precipitation which fell during November 17-18 and 21. The most widespread precipitation for the month fell during November 24-26. Most areas of the state received around 1.5 inches of rain with lesser amounts falling in northwestern Ohio. The month ended with light showers falling during the last two days with amounts of up to 0.5 inch reported at most locations; however, some areas in southern Ohio received nearly 1 inch or slightly more during this period.

Precipitation for the 1996 calendar year is above normal throughout Ohio. The state average is 43.36 inches, 8.37 inches above normal. Regional averages range from 51.00 inches, 13.55 inches above normal, for the Southwest Region, to 32.26 inches, 0.75 inch above normal, for the Northwest Region. Cumulative
(continued on back)

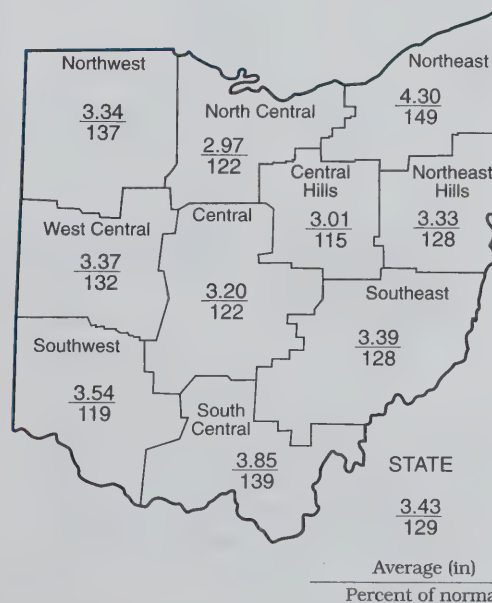
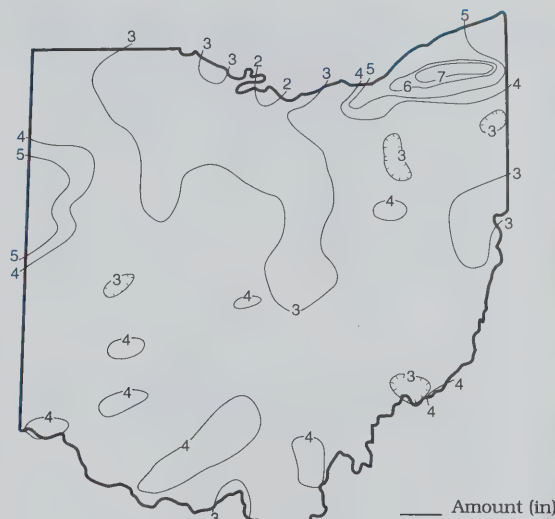
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.91 | +0.66 | +0.37 | -0.53 | -1.61 | +1.0 |
| North Central | +0.54 | +5.78 | +4.04 | +5.10 | +9.95 | +4.2 |
| Northeast | +1.42 | +8.16 | +8.88 | +12.29 | +13.27 | +6.0 |
| West Central | +0.81 | +2.43 | +1.52 | +7.17 | +12.56 | +3.3 |
| Central | +0.58 | +2.51 | +1.17 | +7.54 | +12.71 | +3.7 |
| Central Hills | +0.40 | +4.60 | +3.44 | +7.76 | +11.63 | +4.6 |
| Northeast Hills | +0.73 | +4.16 | +4.37 | +7.55 | +5.24 | +3.5 |
| Southwest | +0.56 | +2.43 | +2.25 | +13.60 | +16.55 | +5.0 |
| South Central | +1.08 | +1.83 | +1.95 | +8.48 | +8.39 | +3.3 |
| Southeast | +0.75 | +2.86 | +2.55 | +9.81 | +9.63 | +4.4 |
| State | +0.78 | +3.54 | +3.06 | +7.90 | +9.87 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION NOVEMBER



MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | This Month Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|------------------------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,731 | 240 | 228 | 191 | 151 |
| Great Miami River at Hamilton | 3,630 | 2,427 | 186 | 140 | 188 | 174 |
| Huron River at Milan | 371 | 192 | 221 | 175 | 152 | 134 |
| Killbuck Creek at Killbuck | 464 | 484 | 235 | 238 | 200 | 158 |
| Little Beaver Creek near East Liverpool | 496 | 473 | 207 | 169 | 128 | 130 |
| Maumee River at Waterville | 6,330 | 3,420 | 192 | 111 | 160 | 112 |
| Muskingum River at McConnelsville | 7,422 | 7,082 | 151 | 148 | 151 | 145 |
| Scioto River near Prospect | 567 | 320 | 330 | 186 | 154 | 148 |
| Scioto River at Higby | 5,131 | 3,460 | 183 | 154 | 208 | 178 |
| Stillwater River at Pleasant Hill | 503 | 255 | 277 | 128 | 155 | 149 |

STREAMFLOW during November was noticeably above normal throughout the state. Flows in north-central, northeastern and eastern Ohio were high enough to be considered excessive. Flows during November were greater than the flows during October statewide.

Flows at the beginning of the month were above normal throughout most of the state but had fallen to below normal in western Ohio. Flows steadily declined during the first week of the month with nearly all locations recording the month's lowest flows during November 5-7. Flows increased following the precipitation of November 7-10 with some basins in northeastern and northwestern Ohio recording their greatest flows for the month during November 9-10. Basins in the remaining areas of the state had their greatest flows during November 26-28 following the month's most widespread precipitation of November 24-26. Flows at the end of the month were noticeably above normal throughout most of the state.

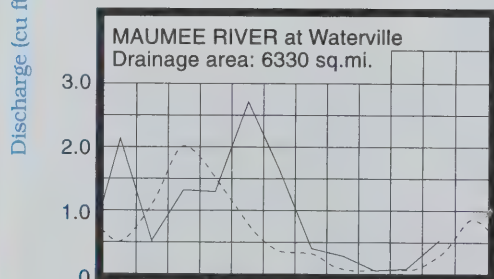
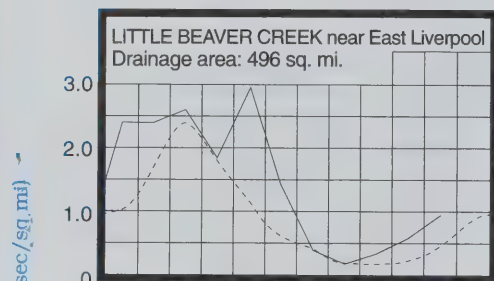
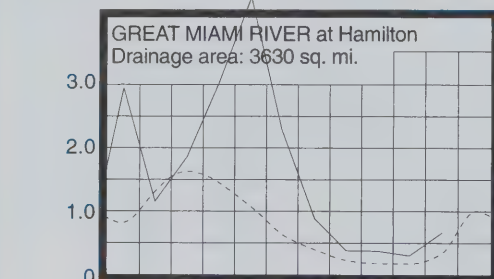
est flows during November 26-28 following the month's most widespread precipitation of November 24-26. Flows at the end of the month were noticeably above normal throughout most of the state.

RESERVOIR STORAGE for water supply during November was unchanged in the Mahoning basin reservoirs and increased in the Scioto basin reservoirs. Storage remained at noticeably above normal levels in the Mahoning basin and increased to above normal levels in the Scioto basin.

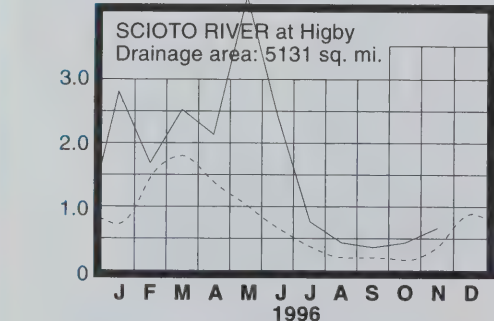
Reservoir storage at the end of November in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with the same for last month and 69 percent for November 1995. Storage has been stable in the Mahoning basin for the past several months. Month-end storage in the Scioto basin index reservoirs was 76 percent of rated capacity for water supply compared with 69 percent for last month and 90 percent for November 1995. Surface water supplies remain in good condition throughout the state.

MEAN STREAM DISCHARGE

(4.81-Off the chart)

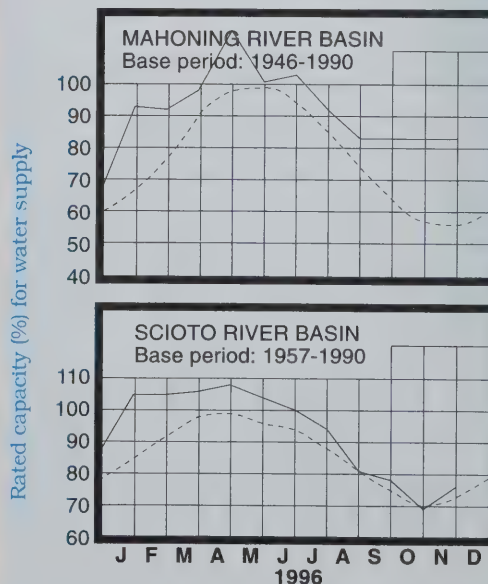


(4.86 - Off the chart)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 18.38 | -1.12 | -0.49 | +0.32 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 9.79 | -0.84 | -0.22 | -1.96 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.89 | +1.40 | +0.08 | +0.06 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.42 | +1.24 | +0.32 | +0.90 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 10.64 | -1.01 | -0.92 | -1.25 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.09 | +0.59 | +0.13 | +1.08 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.41 | -0.85 | +0.24 | +1.57 |

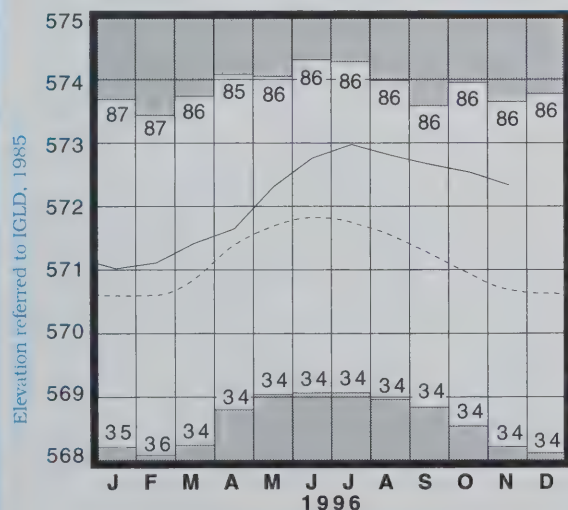
GROUND WATER LEVELS during November showed mixed responses across the state. Generally, levels rose in unconsolidated aquifers and declined in consolidated aquifers. An exception was in northeastern Ohio where levels rose in all aquifers. Precipitation in northeastern Ohio was above normal in both October and November while the remainder of the state had below normal precipitation during October which would delay recharge to deeper aquifers. Generally, ground water levels declined or were stable during the first three weeks of November and then rose during the last week in response to the month's most widespread precipitation.

Although ground water levels have fallen to below normal in some consolidated aquifers, ground water supplies continue to remain adequate throughout the state. Levels in most aquifers are higher than they were a year ago except in some consolidated aquifers in the western half of the state where they are lower. Conditions are favorable for improvement in ground water storage during the 1997 water year recharge period.

LAKE ERIE level declined during November. The mean level was 572.34 feet (IGLD-1985), 0.20 foot below last month's mean level and 1.64 feet above normal. This month's level is 1.01 feet above the November 1995 level and 3.14 feet above Low Water Datum.

The U. S. Army Corps of Engineers predicts that, based on the present condition of the Great Lakes basin and anticipated future weather conditions, the level of Lake Erie will continue to remain above the long-term average for the next several months.

LAKE ERIE LEVELS at Fairport

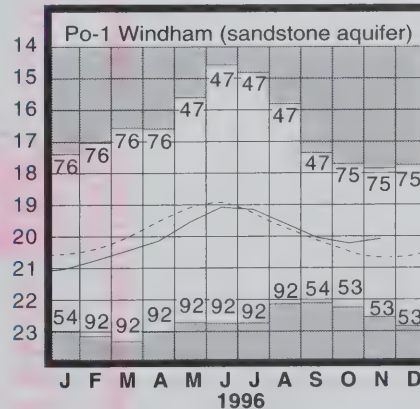
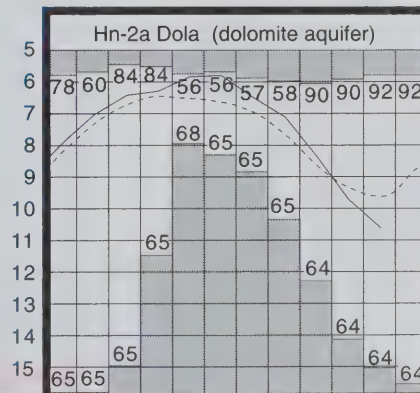
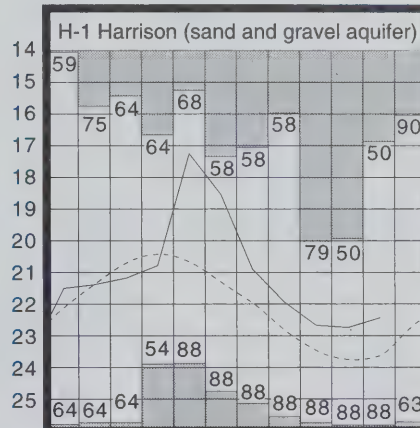


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current ———

(continued from front page)

1996 calendar year precipitation totals in most areas of the state have already exceeded the annual average with the only exception being in northwestern Ohio. The Northeast and Southwest regions have the potential to reach record or near-record annual precipitation amounts.

Precipitation for the first two months of the 1997 water year is above normal throughout most of the state, but slightly below normal in the Southwest and West Central regions. The state average is 5.85 inches, 0.86 inch above normal. Regional averages range from 8.71 inches, 3.11 inches above normal, for the Northeast Region to 4.89 inches for both the Central and West Central regions, 0.13 inch above normal and 0.01 inch below normal, respectively.

SUMMARY

Precipitation was above normal throughout the state. Near-record snow fell in portions of northeastern Ohio. Streamflow was noticeably above normal throughout the state. Reservoir storage was unchanged in the Mahoning basin reservoirs and increased in the Scioto basin reservoirs. Storage was above normal in both basins. Ground water storage increased in unconsolidated aquifers, but declined in consolidated aquifers. Lake Erie level declined 0.20 foot and was 1.64 feet above the long-term November average.

NOTES AND COMMENTS

NEW ADMINISTRATOR FOR OHIO'S DAM SAFETY PROGRAM

Division of Water Chief Michele Willis recently announced the appointment of Mark Ogden as administrator of the division's Water Engineering Group. Mark will fill the vacancy created after George Mills, administrator for more than seven years, retired at the end of September.

As administrator of the Water Engineering Group, Mark will direct Ohio's dam safety program including inspections of existing dams and issuing permits for new dams, dikes and levies, the hydraulic operations and maintenance of Ohio's historic canal systems, and other water engineering projects for the ODNR owned facilities.

Mark, a graduate of The Ohio State University, has worked for the Division of Water for more than eleven years. He is a registered professional engineer in Ohio and has been active in the Water Management Association of Ohio for many years.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:
Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

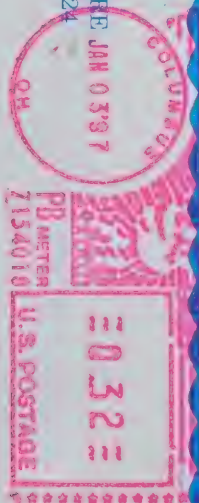
Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
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MONTHLY WATER INVENTORY REPORT FOR OHIO

December 1996

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during December was above normal throughout most of the state with only a few locations in southeastern Ohio receiving below normal precipitation. The state average was 3.82 inches, 1.24 inches above normal. Regional averages ranged from 4.37 inches, 1.90 inches above normal, for the West Central Region to 2.95 inches, 0.23 inch above normal, for the Southeast Region. Lakeview (Logan County) reported the greatest amount of precipitation for the month, 5.76 inches. Philo (Muskingum County) reported the least amount, 1.90 inches.

Precipitation during December fell as both rain and snow, but generally, snow amounts were below normal throughout the state. December started with some scattered rain showers during the first week which changed to snow showers early in the second week. Precipitation amounts were generally 0.5 inch during this period, but some areas reported up to 1 inch of precipitation. Stronger storms crossed the state during December 11-12. The greatest amounts reported were more than 1 inch which fell across northern and south-central Ohio. The month's greatest precipitation for much of the state fell during December 16-17. Most areas received about 1 inch of rain, but some areas reported nearly 2 inches. More rain showers fell during December 22-23 with amounts generally around 0.5 inch, but more than 1 inch was reported at some locations. Light rain and snow showers persisted during the last week of the month producing only small amounts of precipitation.

Precipitation for the 1997 water year is above normal throughout the state. The state average is 9.63 inches, 2.06 inches above normal. Regional averages range from 12.56 inches, 4.32 inches above normal, for the Northeast Region to 8.42 inches, 0.73 inch above normal, for the Southeast Region (see Precipitation table, departure from normal, past 3 months column). Precipitation and other climatic conditions have been favorable for recharge to water supplies so far during the 1997 water year.

Precipitation for the 1996 calendar year was above normal throughout the state except for a small area in northwestern Ohio where it was below normal. The state average was 47.13 inches, 9.56 inches above normal. This ranks 1996 as the fourth wettest year in the past 114 years for the state as a whole. Regional averages ranged from 55.20 inches, 14.93 inches above normal, for the Southwest Region to 35.53 inches, 1.71 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). This was the wettest year of record for the Northeast Region, the second wettest for the Central Hills and Southwest regions, the third wettest for the Northeast Hills and Southeast regions, the fourth wettest for the Central and West Central regions, the fifth wettest for the South Central Region, and the eighth wettest for the North Central Region. Andover (Ashtabula County) reported the greatest amount of

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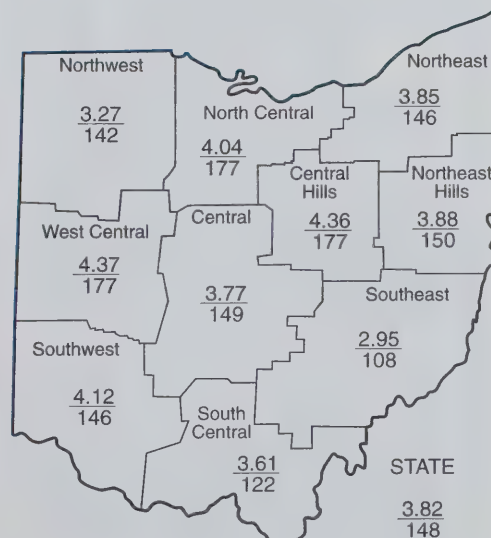
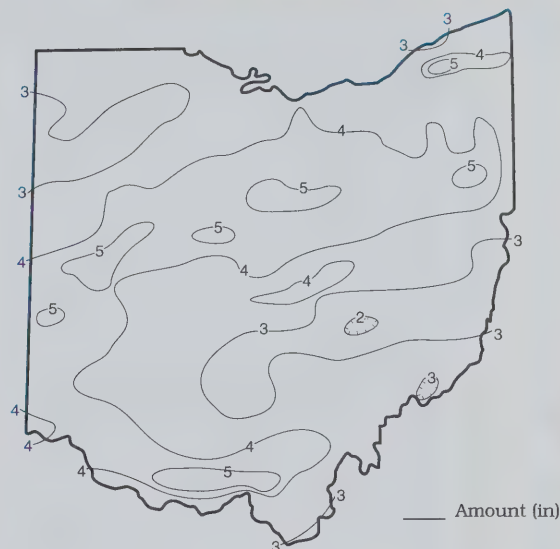
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.96 | +1.66 | +0.66 | +1.71 | -0.89 | +1.9 |
| North Central | +1.76 | +2.98 | +4.88 | +7.34 | +11.09 | +4.5 |
| Northeast | +1.21 | +4.32 | +8.41 | +13.58 | +14.38 | +6.1 |
| West Central | +1.90 | +1.95 | +3.36 | +9.82 | +14.85 | +4.6 |
| Central | +1.24 | +1.31 | +2.15 | +9.20 | +14.01 | +3.9 |
| Central Hills | +1.89 | +2.66 | +4.13 | +10.04 | +13.07 | +5.0 |
| Northeast Hills | +1.30 | +2.62 | +3.74 | +9.28 | +6.36 | +4.2 |
| Southwest | +1.30 | +1.17 | +1.83 | +14.93 | +18.23 | +5.1 |
| South Central | +0.65 | +1.24 | +1.42 | +9.35 | +9.06 | +3.3 |
| Southeast | +0.23 | +0.73 | +2.22 | +10.19 | +9.83 | +3.9 |
| State | +1.24 | +2.06 | +3.28 | +9.56 | +11.03 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION DECEMBER 1996



Average (in)
Percent of normal

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,381 | 141 | 179 | 169 | 157 |
| Great Miami River at Hamilton | 3,630 | 9,968 | 271 | 232 | 182 | 195 |
| Huron River at Milan | 371 | 1,078 | 728 | 402 | 221 | 162 |
| Killbuck Creek at Killbuck | 464 | 1,427 | 383 | 341 | 235 | 183 |
| Little Beaver Creek near East Liverpool | 496 | 1,296 | 292 | 277 | 171 | 146 |
| Maumee River at Waterville | 6,330 | 13,495 | 249 | 191 | 166 | 132 |
| Muskingum River at McConnelsville | 7,422 | 16,120 | 226 | 208 | 151 | 159 |
| Scioto River near Prospect | 567 | 1,969 | 752 | 564 | 293 | 182 |
| Scioto River at Higby | 5,131 | 11,886 | 259 | 235 | 189 | 194 |
| Stillwater River at Pleasant Hill | 503 | 1,419 | 352 | 301 | 195 | 173 |

STREAMFLOW during December was noticeably above normal throughout the state. Flows were high enough to be considered excessive in all drainage basins statewide. Flows in north-central, western and south-western Ohio were the second or third highest of record for December with flows in the other areas of the state easily ranking in the top ten highest for December.

Flows at the beginning of the month were noticeably above normal throughout the state. Generally, flows declined during the first ten days of the month with all drainage basins having their month's lowest flows during December 10-11. The greatest flows for the month occurred regionally at different times following the passage of storm systems generally during December 12-13 in northern Ohio, during December 18-19 in central,

eastern, and southern Ohio, and during December 24-25 in western and northwestern Ohio. Flows at the end of the month remained noticeably above normal throughout the state.

Streamflow during the 1996 calendar year was notably above normal throughout the state (see Mean Stream Discharge table, departure from normal, past 12 months column). Flooding occurred during January and during the late spring and early summer months. The January flooding was caused by rapid snowmelt and rain falling on frozen ground. The counties that border the Ohio River were the most severely impacted. Much of the runoff came from the drainage area of the Ohio River in Pennsylvania. Flooding that occurred during April, May, and June was caused by heavy rain showers and locally severe thunderstorms throughout the period. Soils were at or near moisture retention capacities thus resulting in increased runoff. Many locations had record or near-record May flows. December flows were also near-record in north-central, western, and southwestern Ohio.

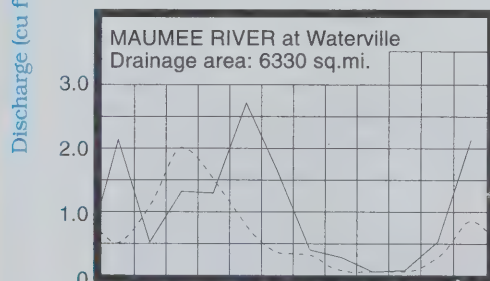
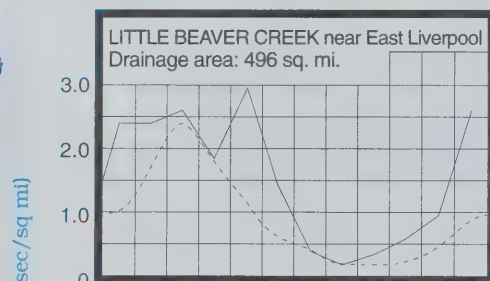
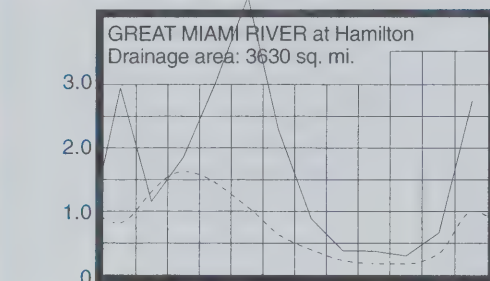
RESERVOIR STORAGE for water supply during December increased sharply in the Scioto basin reservoirs and declined slightly in the Mahoning basin reservoirs. Storage remained noticeably above normal in both basins.

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 81 percent of rated capacity for water supply compared with 83 percent for last month and 68 percent for December 1995. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with 76 percent for last month and 88 percent for December 1995.

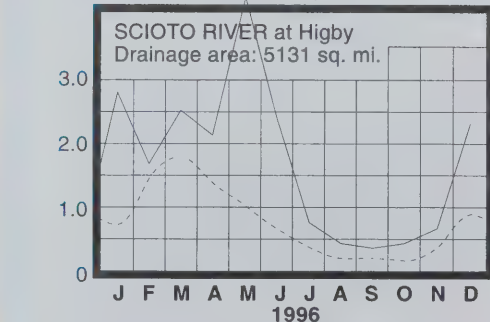
Surface water supplies were adequate throughout the 1996 calendar year. Storage in both on- and off-stream reservoirs was near or above normal throughout the year. High water levels were a nuisance during the winter and spring months as flood-control reservoirs often needed to utilize available storage. Some reservoirs in the lower Scioto River basin reached record or near-record levels during May. Recreational reservoirs easily maintained summer pool levels during most of the season. At the end of the year, surface water supplies are in excellent condition.

MEAN STREAM DISCHARGE

(4.81-Off the chart)

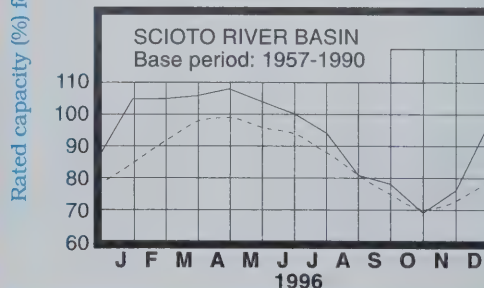
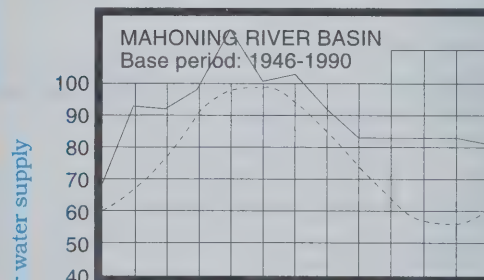


(4.86 - Off the chart)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

GROUND WATER LEVELS during December rose throughout the state. Net changes during December from last month's levels were noticeably greater than usually observed. Generally, levels rose steadily throughout the month in consolidated and most deep, unconsolidated aquifers while levels in shallow, unconsolidated aquifers responded quickly to precipitation, rising sharply after mid-month.

The 1997 water year recharge season is off to a good start as far as ground water supplies are concerned. Current ground water levels are near or slightly above normal in consolidated aquifers and favorably above normal in most unconsolidated aquifers. This year's levels are also notably above last year's levels in most aquifers, especially in the eastern half of the state where levels have been slowly recovering from deficient recharge during the past few years.

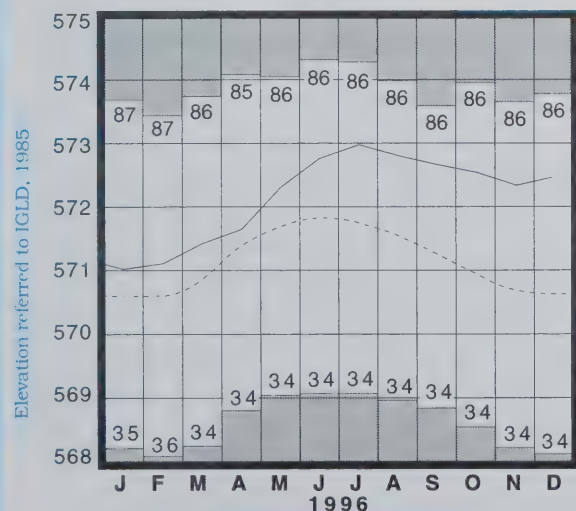
The 1996 calendar year was good for ground water supplies. As the year began, levels were just beginning to recover from dry conditions in 1994 and 1995. The year roared off to a good start as significant recharge occurred after the January thaw when snowmelt and rain combined to produce high-water conditions in many areas of the state. Although ground water levels in aquifers in the eastern half of Ohio remained below normal, they were well on their way to recovery after January. Additional recharge continued through the middle of June as the late spring months were unusually wet. By early summer, ground water levels throughout the state had finally recovered to near or above normal levels. Ample precipitation during the summer months reduced demand, and although August was very dry, ground water supplies continued to remain in good condition. Seasonal declines in ground water levels during September and October, enhanced by the lack of August precipitation, did not have a serious adverse effect on ground water supplies. Favorable climatic and soil moisture conditions during the late autumn months resulted in recharge starting in November and continuing steadily through the end of the year. Ground water supplies are in good condition at the end of 1996.

LAKE ERIE level rose during December. The mean level was 572.47 feet (IGLD-1985), 0.13 foot above last month's mean level and 1.84 feet above normal. This month's level is 1.24 feet above the December 1995 level and 3.27 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during December averaged 3.1 inches, 0.5 inch above normal. The entire Great Lakes basin also averaged 3.1 inches of precipitation during December, 0.8 inch above normal. For calendar year 1996, the Lake Erie basin averaged 41.2 inches of precipitation, 6.3 inches above normal, and the entire Great Lakes basin averaged 36.8 inches, 4.5 inches above normal.

Lake Erie remained above the long-term average level throughout the 1996 calendar year. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the next several months.

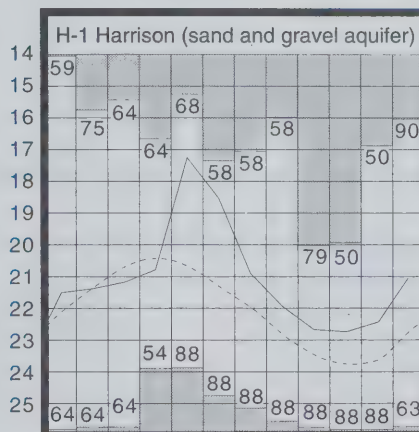
LAKE ERIE LEVELS at Fairport



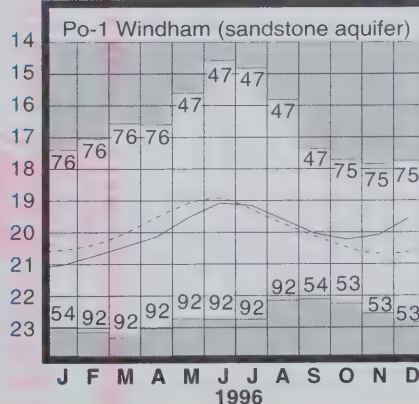
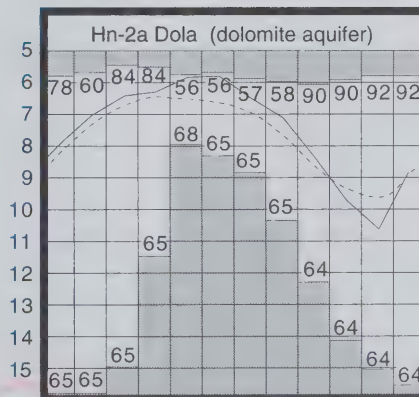
Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS



Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

(continued from front page)

precipitation during 1996, 69.54 inches. Bowling Green (Wood County) reported the least amount of precipitation during 1996, 28.41 inches, the only location reporting less than 30 inches for the year. An isohyetal map and regional averages with percentages of normal precipitation for the 1996 calendar year appear on the last page of this report.

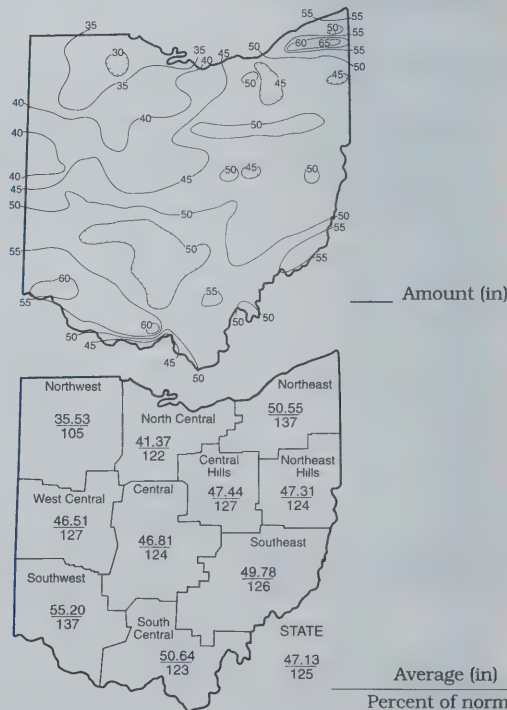
The 1996 calendar year was good for water supplies, but also included serious flooding events and delays in many spring agricultural activities. Much of Ohio had noticeably above normal snow during the first half of January which melted quickly after mid-month as temperatures warmed and rain fell throughout the state. Flooding of low-lying areas occurred statewide with counties bordering the Ohio River severely impacted. February precipitation was above normal in eastern Ohio, but below normal in western Ohio. March precipitation was below normal throughout the state except in a small area of southwestern Ohio. Then the rains began. April was the sixth wettest on record and May was the fifth wettest. June precipitation was noticeably above normal throughout much of the state and July precipitation was above normal except in a few areas of northeastern Ohio. Conditions started to change during the second half of July and quickly did an about face as August was unusually dry. The west-central and north-central areas of the state experienced record or near-record dryness in August, and for the state as a whole, it was the sixth driest August. September precipitation returned to the earlier pattern, being the second wettest on record for the state as a whole and regionally, the wettest September for the Northeast and North Central regions and the second wettest for the Central Hills Region. Northeastern Ohio continued to be unusually wet during October, but the remainder of the state had below normal precipitation. Precipitation was above normal throughout the state during both November and December with significant lake-effect snow falling in the snowbelt areas of northeastern Ohio during the second week of November.

SUMMARY

Precipitation for December was above normal throughout the state. Streamflow was notably above normal throughout the state. Reservoir storage increased in the Scioto basin and declined slightly in the Mahoning basin. Storage remained above normal in both basins. Ground water levels rose in all aquifers across the state and were above normal statewide. Lake Erie level rose 0.13 foot and was 1.84 feet above the long-term December average.

Precipitation for the 1996 calendar year was above normal throughout the state. The state average was 47.13 inches which ranks as the fourth wettest year during the past 114 years. This was the wettest year on record for the Northeast Region. Streamflow was noticeably above normal for the year. Reservoirs and surface water supplies were in good condition throughout the year. Ground water supplies improved considerably during the year. Lake Erie level was above the long-term average throughout the year. The 1996 calendar year was good for water supplies but also included serious flooding and delays in spring agricultural activities.

PRECIPITATION 1996 CALENDAR YEAR



ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
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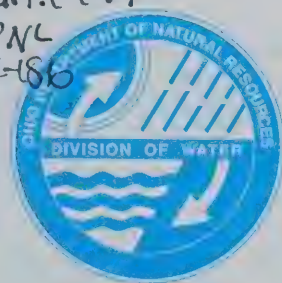
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OHIO STATE WATER SURVEY LABORATORY

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MONTHLY WATER INVENTORY REPORT FOR OHIO

January 1997

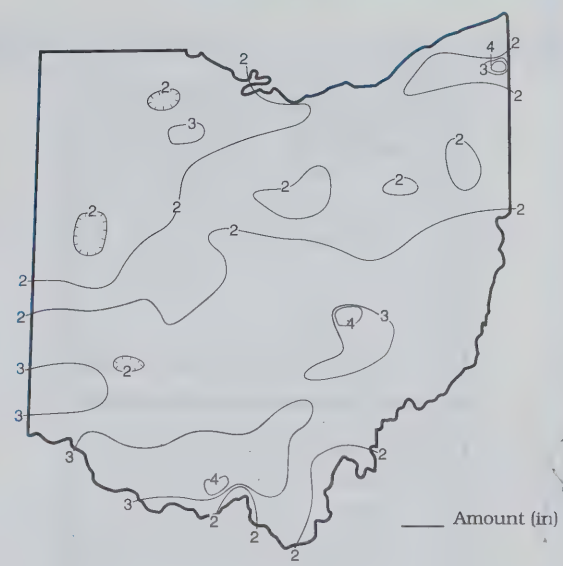
Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during January was below normal throughout most of the state with only the Northwest Region and a few areas in southern Ohio having above normal precipitation. The state average was 2.21 inches, 0.55 inch below normal. Regional averages ranged from 2.72 inches, 0.51 inch below normal, for the Southwest Region to 1.80 inches, 0.50 inch below normal, for the North Central Region. The Northwest Region averaged 2.28 inches of precipitation in January, 0.10 inch above normal. Shawnee State Forest (Scioto County) reported the greatest amount of precipitation for the month, 4.67 inches. Zanesville (Muskingum County) and Andover (Ashtabula County) also reported 4 or more inches of precipitation for January. Fredericktown (Knox County) reported the least amount of January precipitation, 1.17 inches.

Most of the precipitation during January fell as rain. Snow amounts were below normal throughout most of the state with only a few areas in northwestern and northeastern Ohio having near or above normal snowfall. The first three weeks of the month were rather dry in most areas of Ohio, although some precipitation fell during every week. Weekly amounts during this period were generally 0.25 to 0.5 inch or less. The last ten days of the month were much wetter with many reporting stations having measurable precipitation on several days during the January 22-28 period. Most areas of the state received up to 1 inch of rain during January 22-25 with some locations reporting nearly 2 inches. The month's heaviest storms crossed the state on January 26-27 when nearly 1 inch of rain fell at most locations with greater amounts of nearly 2 inches reported in some southern areas of the state.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 11.83 inches, 1.50 inches above normal. Regional averages range from 14.60 inches, 3.77 inches above normal, for the Northeast Region to 10.66 inches, 0.56 inch above normal, for the Central Region.

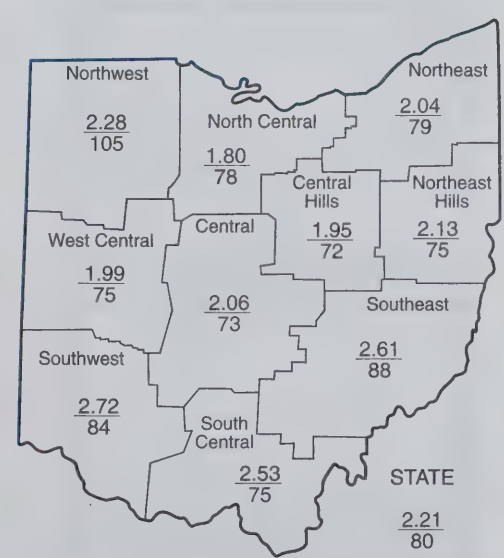
PRECIPITATION JANUARY 1997



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.10 | +1.97 | +0.29 | +1.38 | -1.43 | +1.7 |
| North Central | -0.50 | +1.82 | +4.36 | +6.72 | +8.55 | +3.5 |
| Northeast | -0.55 | +2.08 | +7.78 | +12.25 | +12.30 | +4.8 |
| West Central | -0.68 | +2.07 | +1.06 | +8.00 | +14.38 | +3.8 |
| Central | -0.75 | +1.00 | +0.71 | +7.37 | +11.83 | +3.0 |
| Central Hills | -0.75 | +1.55 | +3.78 | +8.41 | +9.98 | +3.4 |
| Northeast Hills | -0.70 | +1.24 | +3.30 | +7.51 | +5.15 | +3.1 |
| Southwest | -0.51 | +1.38 | +1.08 | +13.36 | +18.02 | +4.0 |
| South Central | -0.84 | +0.69 | +0.15 | +7.12 | +7.25 | +2.2 |
| Southeast | -0.36 | +0.71 | +0.40 | +8.15 | +8.16 | +2.9 |
| State | -0.55 | +1.46 | +2.29 | +8.04 | +9.45 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,768 | 168 | 168 | 174 | 144 |
| Great Miami River at Hamilton | 3,630 | 4,783 | 161 | 155 | 149 | 180 |
| Huron River at Milan | 371 | 1,130 | 318 | 331 | 278 | 179 |
| Killbuck Creek at Killbuck | 464 | 597 | 158 | 235 | 237 | 170 |
| Little Beaver Creek near East Liverpool | 496 | 716 | 144 | 192 | 189 | 139 |
| Maumee River at Waterville | 6,330 | 6,929 | 220 | 177 | 143 | 122 |
| Muskingum River at McConnelsville | 7,422 | 9,774 | 124 | 165 | 160 | 153 |
| Scioto River near Prospect | 567 | 571 | 169 | 263 | 227 | 159 |
| Scioto River at Higby | 5,131 | 6,337 | 170 | 179 | 176 | 180 |
| Stillwater River at Pleasant Hill | 503 | 637 | 176 | 185 | 160 | 151 |

STREAMFLOW during January was above normal throughout the state. Flows in north-central and northeastern Ohio were high enough to be considered excessive. Flows during January were less than the near-record flows recorded during December.

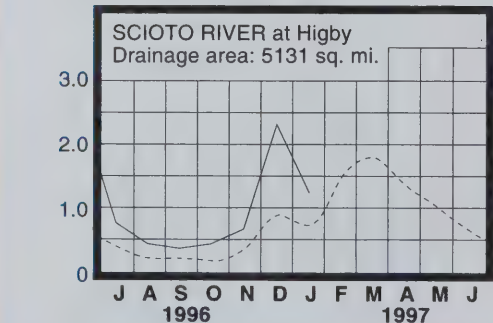
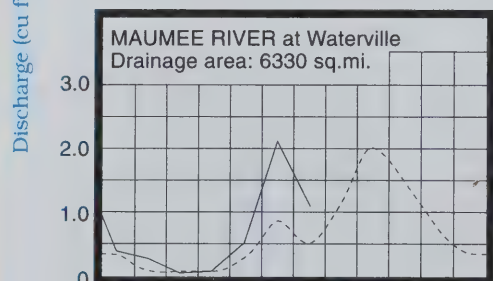
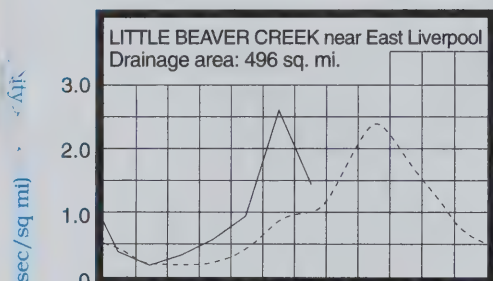
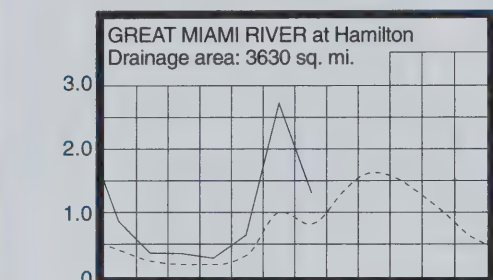
Flows at the beginning of the month were above normal throughout most of the state, but had fallen to slightly below normal in the basins draining into Lake Erie in north-central and northeastern Ohio. Generally, flows declined during the first three weeks of the month with slight increases occurring after light showers. Most drainage

basins had their lowest flows for the month during January 19-21. The exception was in northeastern Ohio where the lowest flows occurred much earlier in the month happening around either January 2 or January 10. The greatest flows for January occurred during the last week of the month following several days of precipitation that fell during January 22-28. Most drainage basin flows peaked on January 28, but in western and northwestern Ohio, peak flows were a few days earlier. Minor flooding caused by ice jams was reported in some areas. Flows at the end of the month were above normal throughout the state.

RESERVOIR STORAGE for water supply during January increased in the Scioto basin reservoirs and was unchanged in the Mahoning basin reservoirs. Storage remained above normal in both basins.

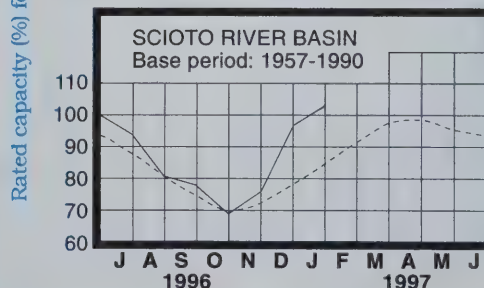
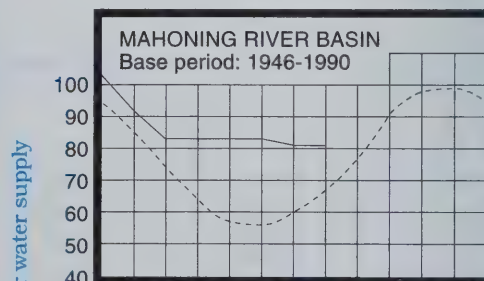
Reservoir storage at the end of January in the Mahoning basin index reservoirs was 81 percent of rated capacity for water supply compared with the same for last month and 93 percent for January 1996. Month-end storage in the Scioto basin index reservoirs was 103 percent of rated capacity for water supply compared with 97 percent for last month and 105 percent for January 1996.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

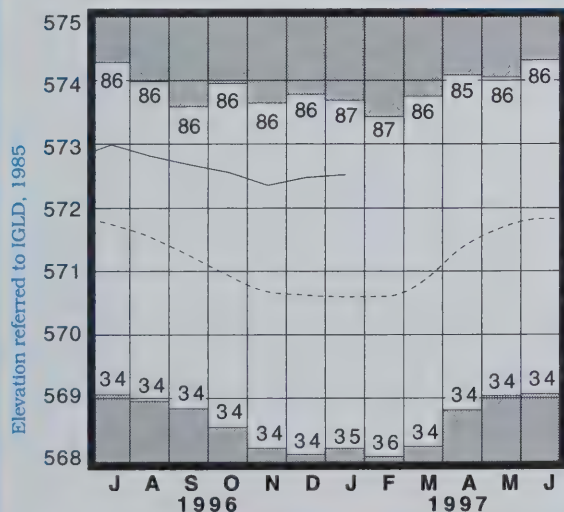
| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 15.69 | -0.14 | +1.23 | +1.82 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.47 | -0.03 | +0.63 | -0.46 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.02 | +1.59 | +0.32 | +0.39 |
| H-1 | Harrison, Hamilton Co. | Gravel | 20.99 | +1.14 | +0.06 | +0.52 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 7.13 | +1.07 | +1.71 | +0.77 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.30 | +1.25 | +0.25 | +1.71 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.44 | +0.49 | +0.19 | +2.90 |

GROUND WATER LEVELS during January showed net rises from last month's levels throughout the state. Generally, levels in consolidated aquifers were stable throughout the month while levels in unconsolidated aquifers declined during the first three weeks of the month and then rose during the last ten days. Net changes during January from December's levels were near normal in consolidated aquifers, but less than usually observed in unconsolidated aquifers.

Ground water supplies are in good condition throughout Ohio. Current levels are higher than they were a year ago and near or above normal throughout the state. Precipitation so far during the 1997 water year has resulted in an excellent start to the recharge period for ground water supplies statewide. Even with the below normal precipitation in January, the current hydrologic and climatic conditions are still favorable for continued improvement in ground water storage. With near-normal climatic conditions during the next several months, ground water supplies should continue to improve and maintain their favorable condition.

LAKE ERIE level rose slightly during January. The mean level was 572.51 feet (IGLD-1985), 0.04 foot above last month's mean level and 1.91 feet above normal. This month's level is 1.45 feet above the January 1996 level and 3.31 feet above Low Water Datum.

LAKE ERIE LEVELS at Fairport

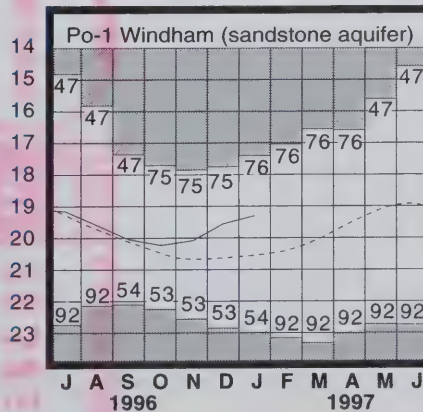
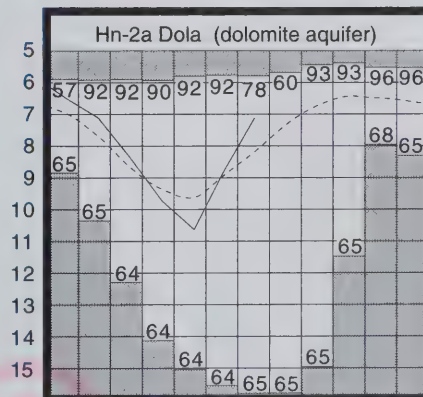
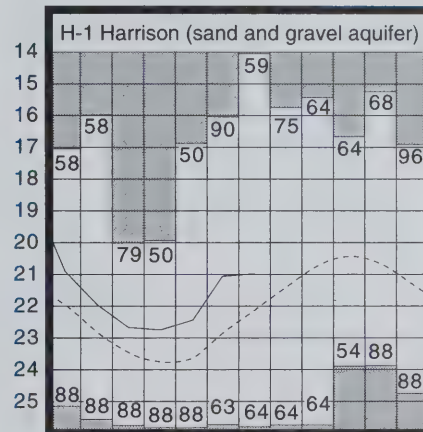


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current

SUMMARY

Precipitation was below normal throughout most of the state with only the Northwest Region and a few areas in southern Ohio having above normal precipitation. Streamflow was above normal statewide. Reservoir storage continued to remain above the normal seasonal levels. Ground water levels showed net improvement during the month and were near or above normal statewide. Lake Erie level rose 0.04 foot and was 1.91 feet above the long-term January average. Water supplies continue to remain in good condition throughout the state.

NOTES AND COMMENTS

The Ohio Department of Natural Resources, as well as many other state and local agencies, cooperate with the U. S. Geological Survey on water resource programs and studies in Ohio. As part of the ODNR Division of Water's effort to disseminate Ohio water resource information, the "Monthly Water Inventory Report For Ohio" will now announce the availability of new reports and documents published cooperatively with the U. S. Geological Survey that concern Ohio's water resources.

NEW PUBLICATION

Effects of Receiving-Water Quality and Wastewater Treatment on Injury, Survival, and Regrowth of Fecal-Indicator Bacteria and Implications for Assessment of Recreational Water Quality (U. S. Geological Survey Water-Resources Investigations Report 96-4199)

by Donna S. Francy, Teresa L. Hart, and Cathj M. Virosteck

This report, prepared in cooperation with the Ohio Water Development Authority, the Northeast Ohio Regional Sewer District, and the Summit County Department of Environmental Services, describes a recent study of the current testing methods for concentration of fecal coliforms that are used for determining the health risks of swimming in receiving waters. The study concluded that different testing standards are needed, particularly in waters in which proportions of chlorinated or dechlorinated effluents are high.

The U. S. Environmental Protection Agency has required states to develop new chlorine water-quality standards for protection of aquatic life. This will require the reduction of chlorine concentration in receiving waters. To meet these standards, many wastewater treatment plants must dechlorinate effluents before discharging them into inland waterways. This process results in a reduction in chlorine-contact time for fecal-indicator bacteria and pathogenic microorganisms. Limited information exists on the effect of dechlorination on the repair and survival of chlorine-injured fecal-indicator bacteria and the possible increased risk of swimming in waters with an undetected population of injured bacteria.

The authors studied the effects of receiving-water quality and wastewater-plant chlorination practices on fecal-coliform injury and survival in receiving waters and on fecal-coliform regrowth on growth medium. Field studies were done to analyze the concentrations of injured and healthy fecal coliforms by the use of standard selective and enhanced-recovery membrane-filtration methods. An attempt was made to determine the relation between the concentrations of fecal coliforms by these two methods by use of linear regression analysis. The report provides water-resource managers with information on the use of enhanced-recovery methods to assess recreational water quality and on the effectiveness of different chlorination practices in reducing fecal-coliform concentrations.

Copies of this report are available from the U. S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43212-5626, phone (614) 469-5553.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Corrosion District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:
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DIVISION OF WATER
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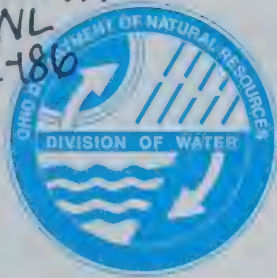
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MONTHLY WATER INVENTORY

APR 8 '97



MONTHLY WATER INVENTORY REPORT FOR OHIO

February 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

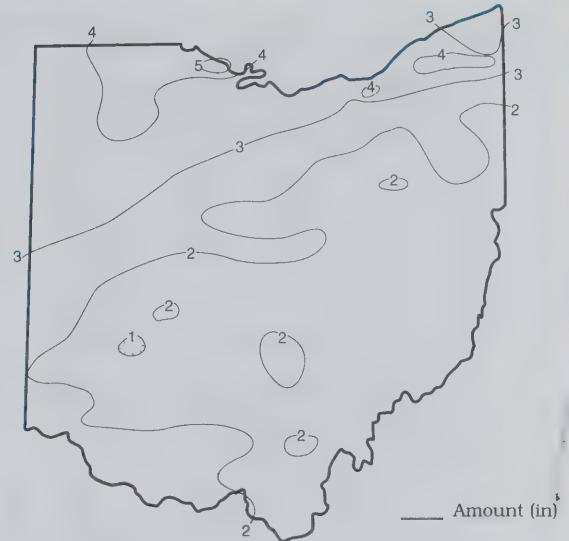
PRECIPITATION during February was above normal in northern and western Ohio, but below normal in the central, eastern and southern areas of the state. The state average was 2.28 inches, 0.04 inch above normal. Regional averages ranged from 3.70 inches, 1.86 inches above normal, for the Northwest Region to 1.68 inches, 0.81 inch below normal, for the Southeast Region. Crane Creek State Park (Ottawa County) reported the greatest amount of precipitation for the month, 5.30 inches. Xenia (Greene County) reported the least amount, 0.91 inch.

Most of the precipitation during February fell as rain. Precipitation for the month accumulated in an atypical pattern with the greatest amounts in northwestern Ohio and lesser amounts in the southern and eastern areas of the state. Snow amounts were generally less than one-half of those usually observed throughout the state. Chardon (Geauga County) reported 11.5 inches of snow for February, about 9 inches below normal. Most of February's precipitation fell during two periods. The first was February 4-5 when most areas of the state received between 0.5 and 1 inch of precipitation with some locations reporting nearly 1.5 inches. This was the month's greatest precipitation for most of the southern half of the state. The next three weeks of the month were rather dry, although some light precipitation fell on many days. Generally, daily amounts were nominal, seldom exceeding 0.1 inch, but a few areas received amounts of up to 0.25 inch on a couple of the days during this period. The month's heaviest storms crossed the northern portion of the state on February 26-27. Most areas in northwestern and extreme northern Ohio received more than 1 inch of rain and some locations reported more than 2 inches. Precipitation amounts decreased rapidly to the south and east totaling only around 0.25 inch in southeastern Ohio. Minor flooding was reported in northern Ohio following these storms.

Precipitation for the 1997 calendar year is below normal throughout most of the state with only the Northwest and North Central regions having above normal precipitation. The state average is 4.50 inches, 0.50 inch below normal. Regional averages range from 6.00 inches, 1.98 inches above normal, for the Northwest Region to 3.82 inches for both the Central Hills and Northeast Hills regions, 0.97 inch and 1.24 inches below normal respectively.

Precipitation for the 1997 water year is above normal throughout most of Ohio with only the South Central and Southeast regions having slightly below normal precipitation. The state average is 14.12 inches, 1.55 inches above normal. Regional averages range from 16.78 inches, 3.78 inches above normal, for the Northeast Region to 12.32 inches, 0.01 inch above normal, for the Central Region.

PRECIPITATION FEBRUARY 1997

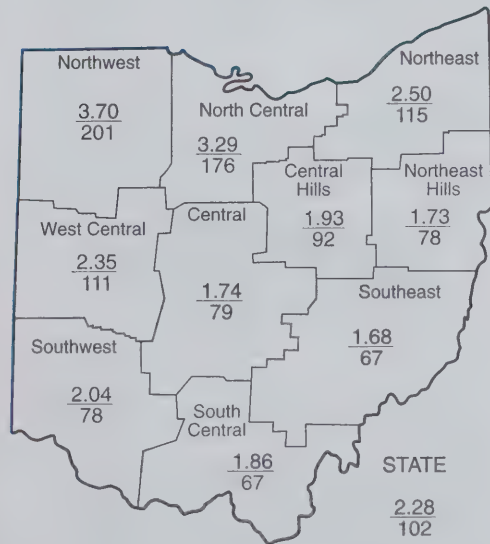


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.86 | +2.91 | +3.62 | +3.94 | +1.53 | +3.0 |
| North Central | +1.42 | +2.82 | +7.94 | +8.15 | +10.74 | +4.4 |
| Northeast | +0.33 | +0.77 | +8.83 | +12.42 | +13.07 | +5.1 |
| West Central | +0.24 | +1.66 | +4.47 | +8.92 | +16.28 | +4.2 |
| Central | -0.47 | -0.11 | +2.39 | +6.76 | +12.12 | +3.2 |
| Central Hills | -0.16 | +0.97 | +5.43 | +8.22 | +10.91 | +3.2 |
| Northeast Hills | -0.50 | +0.09 | +4.16 | +7.03 | +5.39 | +2.7 |
| Southwest | -0.58 | +0.30 | +2.82 | +13.74 | +18.83 | +4.0 |
| South Central | -0.92 | -1.12 | +0.81 | +6.45 | +7.39 | +3.6 |
| Southeast | -0.81 | -1.10 | +1.64 | +6.34 | +7.70 | +3.3 |
| State | +0.04 | +0.72 | +4.20 | +8.20 | +10.42 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,240 | 114 | 130 | 167 | 145 |
| Great Miami River at Hamilton | 3,630 | 6,276 | 129 | 174 | 147 | 185 |
| Huron River at Milan | 371 | 1,231 | 264 | 267 | 268 | 193 |
| Killbuck Creek at Killbuck | 464 | 799 | 114 | 179 | 185 | 173 |
| Little Beaver Creek near East Liverpool | 496 | 740 | 88 | 148 | 148 | 132 |
| Maumee River at Waterville | 6,330 | 15,264 | 217 | 195 | 160 | 140 |
| Muskingum River at McConnellsville | 7,422 | 12,180 | 100 | 137 | 138 | 150 |
| Scioto River near Prospect | 567 | 983 | 147 | 219 | 188 | 164 |
| Scioto River at Higby | 5,131 | 8,893 | 118 | 157 | 149 | 180 |
| Stillwater River at Pleasant Hill | 503 | 936 | 168 | 191 | 138 | 156 |

STREAMFLOW during February was above normal throughout most of the state, with only a few drainage basins in eastern Ohio having slightly below normal flows. Flows in northwestern and north-central Ohio were high enough to be considered excessive. Flows during February increased seasonally from the flows recorded during January.

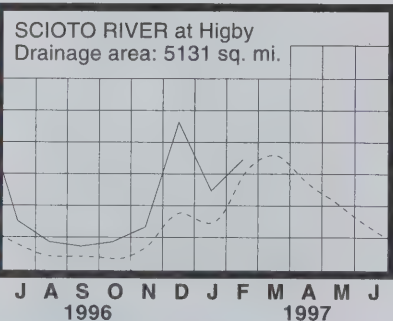
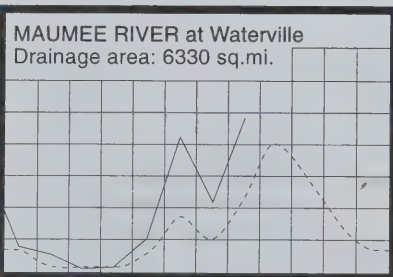
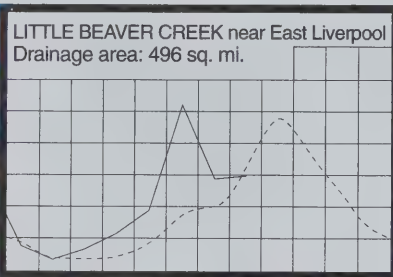
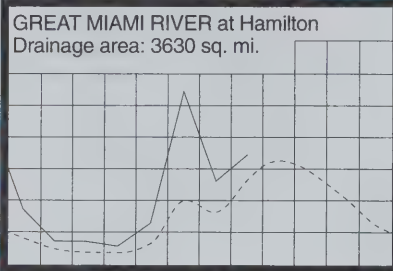
Flows at the beginning of the month were near or slightly below normal throughout the state. Flows increased rapidly after February 4 following the month's most widespread precipitation. Most drainage basins had their greatest flows for the month during February 5-7. Exceptions were in northwestern and north-central Ohio where the month's greatest flows occurred during February 27-28 following heavy storms in northern Ohio. Minor flooding was reported during this period in some basins in this area. Lowest flows for the month occurred during February 16-18 in all drainage basins. Flows at the end of the month above normal in most areas of the state, but slightly below normal in southeastern Ohio.

RESERVOIR STORAGE for water supply during February increased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of February in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply compared with 81 percent for last month and 92 percent for February 1996. Month-end storage in the Scioto basin index reservoirs was 106 percent of rated capacity for water supply compared with 103 percent for last month and 105 percent for February 1996. Surface water supplies continue to remain in good shape throughout the state.

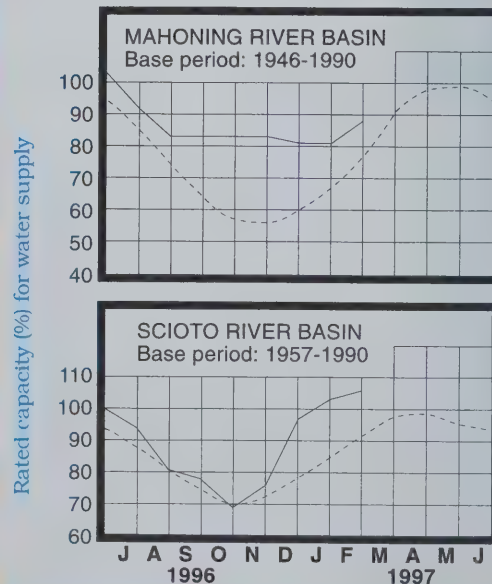
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

GROUND WATER LEVELS during February showed net rises from last month's levels in most aquifers. Net changes during February from January's levels were less than usually observed across the state. Generally, levels in consolidated aquifers and in deep, unconsolidated aquifers were stable or rose gradually during the month while levels in unconsolidated aquifers rose early in the month following widespread precipitation and then stabilized or declined until just before the end of the month.

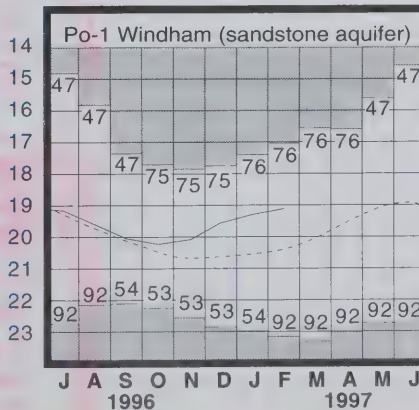
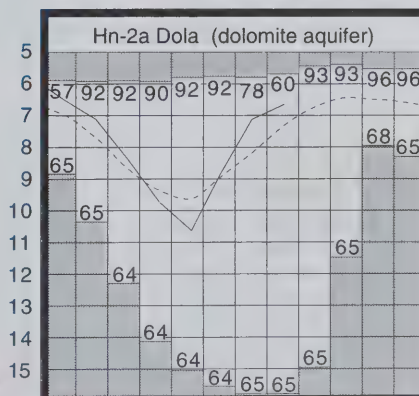
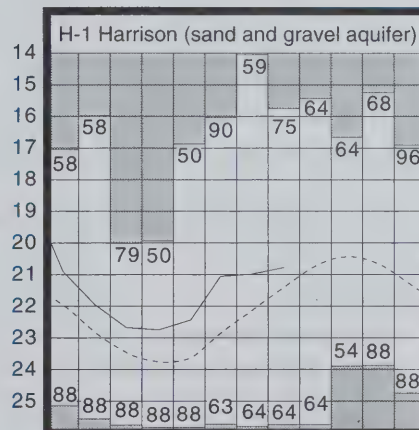
Ground water supplies continue to remain adequate throughout Ohio even though levels in some aquifers have fallen to slightly below normal following sub-par precipitation during the past two months in many areas of the state. However, current levels are higher than they were a year ago in most aquifers due to an excellent start of the 1997 water year recharge period. Ground water levels can be expected to continue to improve during the next few months provided climatic and other hydrologic conditions are near normal during this period.

LAKE ERIE rose during February. The mean level was 572.70 feet (IGLD-1985), 0.19 foot above last month's mean level and 2.10 feet above normal. This month's level is 1.57 feet above the February 1996 level and 3.50 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during February averaged 3.7 inches, 1.6 inches above normal. The entire Great Lakes basin averaged 2.5 inches of precipitation during February, 0.7 inch above normal. For calendar year 1997 through February, the Lake Erie basin has averaged 6.1 inches of precipitation, 1.6 inches above normal, and the entire Great Lakes basin has averaged 5.8 inches, 1.9 inches above normal.

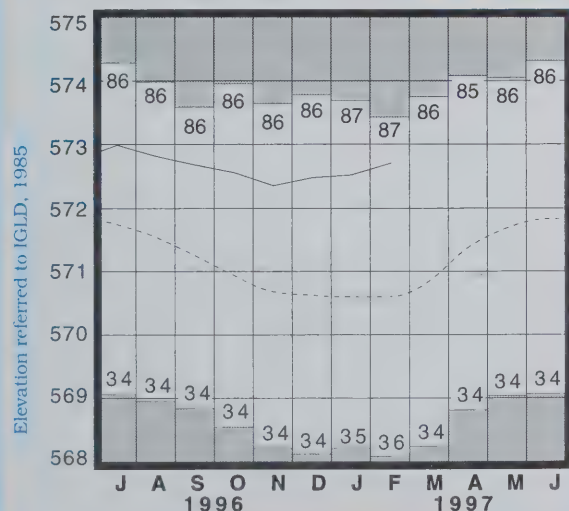
| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 14.63 | -0.15 | +1.06 | +0.06 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.36 | -0.28 | +0.11 | -0.41 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.74 | +1.35 | +0.28 | +0.10 |
| H-1 | Harrison, Hamilton Co. | Gravel | 20.78 | +0.62 | +0.21 | +0.62 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.66 | +0.68 | +0.47 | +0.37 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.12 | +1.28 | +0.18 | +1.64 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.56 | -0.42 | -0.12 | +1.03 |

GROUND-WATER LEVELS



Water level (ft below land surface)

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was above normal in northern and western Ohio, but below normal elsewhere. Streamflow was above normal throughout most of the state. Reservoir storage increased and remained above normal. Ground water levels improved in nearly all aquifers. Lake Erie level rose 0.19 foot and was 2.10 feet above the long-term February average level.

NOTES AND COMMENTS

WMAO ANNUAL SPRING MEETING

The Water Management Association of Ohio (WMAO) will hold its annual spring meeting on May 16-18, 1997 at the Akron Ramada Inn. The meeting is being co-sponsored by WMAO, the Ohio Department of Natural Resources, the All Ohio Chapter of the Soil and Water Conservation Society, and Rivers Unlimited. The theme of this conference will be "Ohio Greenways: Making the Connections." The conference will feature several regional greenways across Ohio and will address topics that focus on economic development, recreation, land use planning, flood control, water quality improvement and protection of sensitive environments.

The meeting is structured so that participants can attend one day or all three days. Several tours have been arranged that will demonstrate how cities, municipalities, regional planners, and others have utilized greenways and the benefits that have been achieved. This meeting will offer an opportunity to network and interact with many new faces and interests and to find out how the many and diverse water management disciplines throughout the state are compatible with land trusts, river protection and other environmental groups, and recreational enthusiasts.

Registration materials will be available soon. For more information contact:

Elaine Marsh
Rivers Unlimited
4570 Akron-Peninsula Road
Peninsula, Ohio 44264-9634
Phone: (216) 657-2055
e-mail: ohgreenway@aol.com

EDITORS NOTE: Flooding in Southern Ohio

As we are all aware, significant flooding occurred in southern Ohio during the first week of March. Information concerning this event will be included in the March issue of the "Monthly Water Inventory Report for Ohio." Verified and detailed information will be available at that time. Governor Voinovich's request to the federal government to declare at least 16 counties in southern Ohio as disaster areas has been approved.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



Department
of Natural
Resources

DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



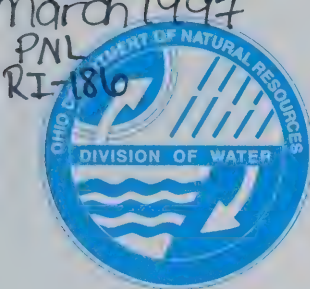
George V. Voinovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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3
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CHAMPAIGN, IL 61820



MONTHLY WATER INVENTORY REPORT FOR OHIO

March 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

AP 2 4 '97

ILLINOIS STATE WATER SURVEY LIBRARY COPY

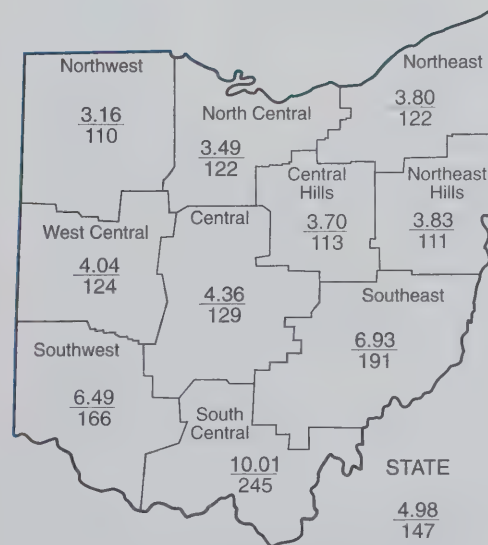
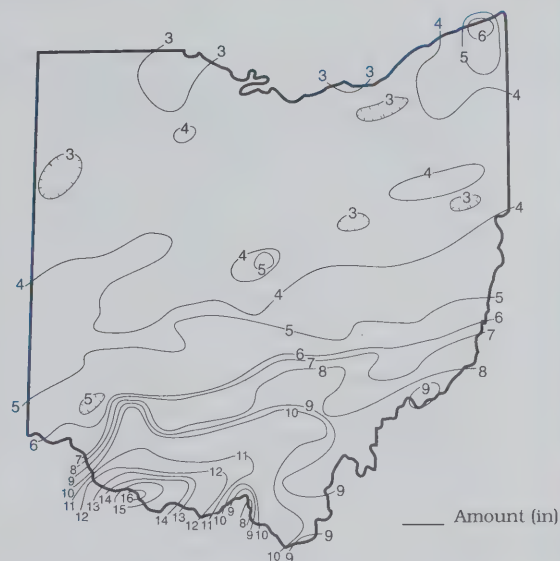
PRECIPITATION during March was above normal throughout the state. The state average was 4.98 inches, 1.60 inches above normal. Regional averages ranged from 10.01 inches, 5.92 inches above normal, for the South Central Region to 3.16 inches, 0.29 inch above normal, for the Northwest Region. This was the wettest March during the past 103 years in the South Central Region. Ripley (Brown County) reported the greatest amount of precipitation for the month, 16.44 inches; West Union (Adams County) reported 14.60 inches. Van Wert (Van Wert County) reported the least amount, 2.50 inches.

Most of the precipitation during March fell as rain. Precipitation fell during every week, but the first half of the month was generally wetter than the second half, especially in the southern half of the state. The month started off with extremely heavy rain falling in southern Ohio on March 1-2. More than 5 inches of rain fell throughout much of south-central and southeastern Ohio with amounts of up to nearly 12 inches reported in portions of Adams, Brown, and Scioto counties. Details about the heavy precipitation and resulting floods is presented under Notes and Comments on the last page of this report. Precipitation amounts diminished rapidly to the north with very little rain falling in the northern one-third of the state. Additional rain fell during the next several days with up to another 1 inch falling in the flood-stricken area by March 6. Rain showers and stronger storms continued to cross the state once or twice a week for the remainder of the month. These storm periods included March 9-10, 13-14, 18-19, 25-26, and 28-29. Precipitation amounts were generally around 0.5 to 0.75 inch during each period, but some locations received 1 inch or more. Many areas in northwestern Ohio reported from 1 to more than 2 inches of precipitation during March 13-14.

Precipitation for the 1997 calendar year is above normal throughout most of Ohio, but slightly below normal in the Central, Central Hills, and Northeast Hills regions. The state average is 9.48 inches, 1.10 inches above normal. Regional averages range from 14.39 inches, 4.15 inches above normal, for the South Central Region to 7.52 inches, 0.86 inch below normal, for the Northeast Hills Region.

Precipitation for the first half of the 1997 water year is above normal throughout the state. The state average is 19.10 inches, 3.15 inches above normal. Regional averages range from 23.54 inches, 5.33 inches above normal, for the South Central Region to 16.68 inches, 1.00 inch above normal, for the Central Region.

PRECIPITATION MARCH 1997



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.29 | +2.27 | +3.95 | +4.80 | +3.01 | +2.7 |
| North Central | +0.63 | +1.70 | +4.30 | +9.21 | +12.45 | +4.1 |
| Northeast | +0.69 | +0.34 | +4.47 | +13.36 | +15.23 | +4.8 |
| West Central | +0.78 | +0.40 | +2.75 | +10.64 | +18.23 | +3.5 |
| Central | +0.99 | -0.11 | +1.00 | +8.26 | +14.92 | +2.8 |
| Central Hills | +0.44 | -0.53 | +2.35 | +8.89 | +13.10 | +3.1 |
| Northeast Hills | +0.38 | -0.86 | +1.90 | +7.64 | +7.59 | +2.4 |
| Southwest | +2.57 | +1.51 | +2.83 | +16.16 | +23.12 | +4.0 |
| South Central | +5.92 | +4.15 | +5.33 | +12.57 | +15.50 | +3.9 |
| Southeast | +3.31 | +2.06 | +2.61 | +9.01 | +12.90 | +3.5 |
| State | +1.60 | +1.10 | +3.15 | +10.06 | +13.63 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,564 | 134 | 125 | 155 | 149 |
| Great Miami River at Hamilton | 3,630 | 9,193 | 155 | 129 | 147 | 192 |
| Huron River at Milan | 371 | 872 | 125 | 189 | 230 | 192 |
| Killbuck Creek at Killbuck | 464 | 1,164 | 124 | 137 | 200 | 174 |
| Little Beaver Creek near East Liverpool | 496 | 1,208 | 102 | 108 | 151 | 131 |
| Maumee River at Waterville | 6,330 | 18,182 | 142 | 163 | 177 | 156 |
| Muskingum River at McConnelsville | 7,422 | 18,799 | 116 | 118 | 143 | 149 |
| Scioto River near Prospect | 567 | 1,507 | 155 | 132 | 173 | 173 |
| Scioto River at Higby | 5,131 | 15,604 | 170 | 127 | 151 | 185 |
| Stillwater River at Pleasant Hill | 503 | 1,234 | 149 | 123 | 141 | 166 |

STREAMFLOW during March was above normal throughout the state. Flows in southern and northwestern Ohio were high enough to be considered excessive. Flows during March increased seasonally from the flows recorded during February in most drainage basins.

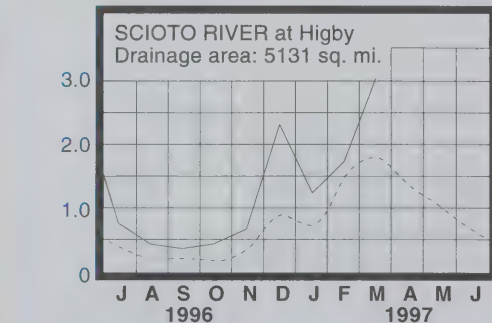
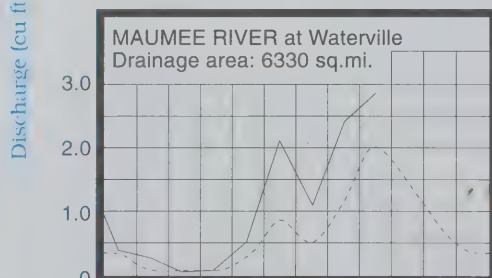
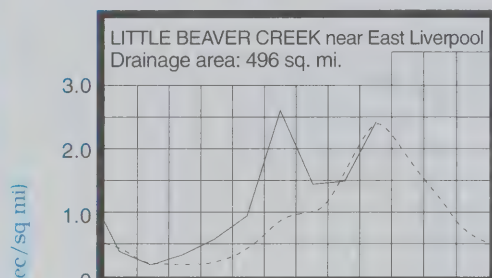
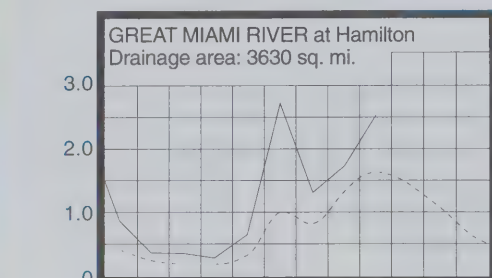
Flows at the beginning of the month were above normal throughout most of the state, but below normal in some drainage basins in eastern Ohio. Greatest flows for the month occurred during March 1-2 in most drainage basins following widespread precipitation which was exceptionally heavy in southern Ohio. Flash flooding, easily exceeding 100-year levels, occurred in extreme southern Ohio with the loss of several lives and millions of dollars in damage to property (see "Heavy Rains Cause Catastrophic Flooding

in Southern Ohio" under Notes and Comments on the last page of this report). Although this storm missed most of northern Ohio, flows were already high at the beginning of the month, still responding to precipitation from storms that crossed the area during the last few days of February. Some basins in eastern Ohio had their greatest flows during March 6-7 following several days with precipitation. Generally, flows remained relatively high during the first half of the month, peaking again around mid-month, and then declining until a few days before the end of the month when flows were at their lowest. Flows increased slightly the last few days of March and had increased enough to be slightly above normal in a few basins in western and north-central Ohio, but were below normal at the end of the month in most areas of the state.

RESERVOIR STORAGE for water supply during March increased in the Mahoning River basin and declined slightly in the Scioto River basin. Storage remained above normal in both basins.

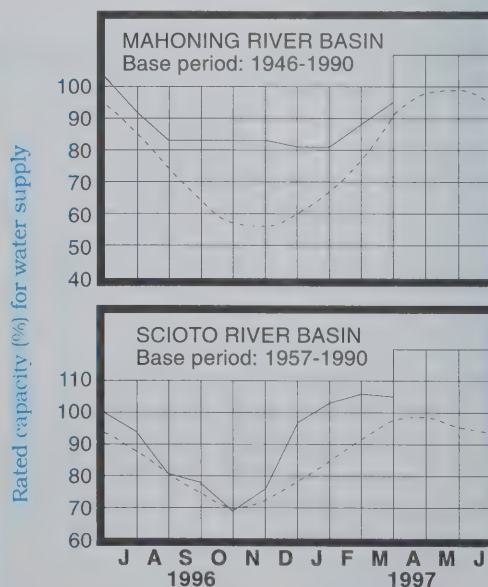
Reservoir storage at the end of March in the Mahoning basin index reservoirs was 95 percent of rated capacity for water supply compared with 88 percent for last month and 98 percent for March 1996. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with 106 percent for last month and 106 percent for March 1996. Surface water supplies continue to remain in good shape throughout the state.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 12.72 | +0.59 | +1.91 | +0.22 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 6.99 | -0.14 | +0.37 | -0.26 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.22 | +1.45 | +0.52 | +0.23 |
| H-1 | Harrison, Hamilton Co. | Gravel | 19.37 | +1.34 | +1.41 | +1.83 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 5.93 | +0.85 | +0.73 | +0.53 |
| Po-1 | Windham, Portage Co. | Sandstone | 18.40 | +1.63 | +0.72 | +2.05 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 11.93 | -0.53 | +0.63 | +0.87 |

GROUND WATER LEVELS during March showed net rises from last month's levels throughout the state. Net changes during March from February's levels were greater than usually observed in most aquifers. Generally, levels in both consolidated aquifers and deep, unconsolidated aquifers rose gradually throughout the month while levels in shallow, unconsolidated aquifers rose sharply during the early part of the month and then declined during the later part of the month.

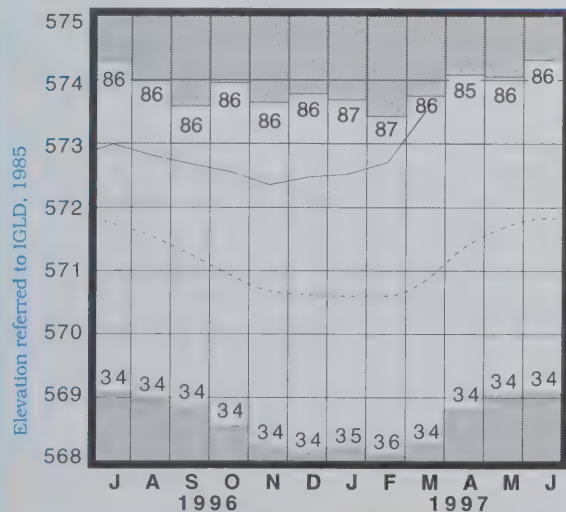
Ground water supplies continue to maintain a favorable position throughout the state. Levels in most aquifers are higher than they were a year ago and are above normal in nearly all aquifers. The above normal precipitation during the first six months of the 1997 water year has been beneficial for ground water supplies (see Precipitation table, departure from normal, past 6 months column). Most aquifers have received an acceptable amount of recharge for the season so far, but additional recharge during the next few months is still needed to maintain these favorable levels.

LAKE ERIE level rose markedly during March. The mean level was 573.52 feet (IGLD-1985), 0.82 foot above last month's mean level and 2.65 feet above normal. This month's level is 2.06 feet above the March 1996 level and 4.32 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during March averaged 3.7 inches, 0.9 inch above normal. The entire Great Lakes basin averaged 2.6 inches of precipitation during March, 0.4 inch above normal. For calendar year 1997 through March, the Lake Erie basin has averaged 9.8 inches of precipitation, 2.5 inches above normal, and the entire Great Lakes basin has averaged 8.3 inches, 2.2 inches above normal.

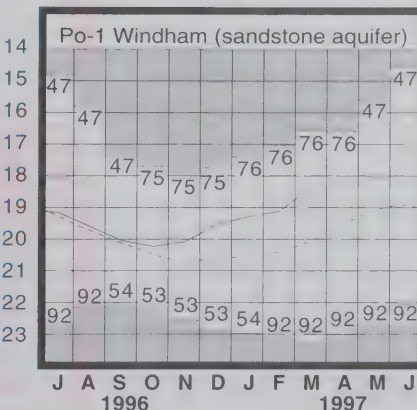
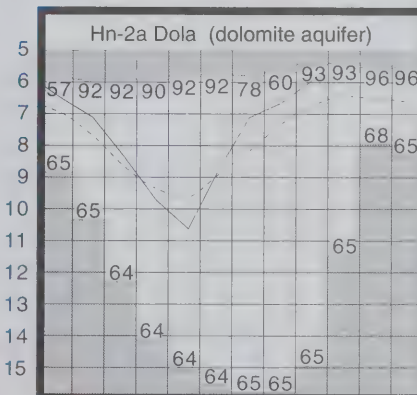
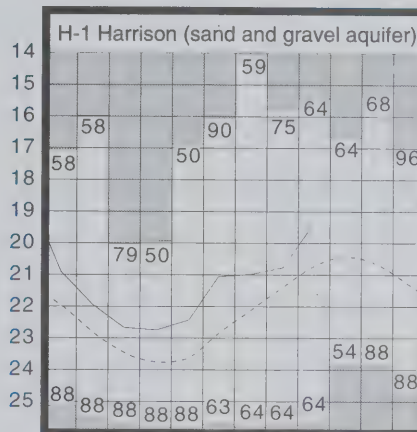
The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the next several months. Projected levels are expected to remain below the record-high levels established during the mid 1980s, but could approach these levels if precipitation in the Lake Erie and other Great Lake's basins is noticeably above normal for an extended period.

LAKE ERIE LEVELS at Fairport



GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990

Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was above normal throughout the state. Streamflow was above normal throughout the state. Catastrophic flooding occurred in southern Ohio during the first week of the month. Many smaller drainage basins had record daily flows easily exceeding the 100-year flood levels. Reservoir storage remained at above normal seasonal levels. Ground water storage improved and was above normal in most areas of the state. Lake Erie level rose 0.82 foot and was 2.65 feet above the long-term March level.

NOTES AND COMMENTS

HEAVY RAINS CAUSE CATASTROPHIC FLOODING IN SOUTHERN OHIO

Heavy rains during March 1-2 caused flash floods across southern Ohio resulting in more than \$180 million in economic loss to public and private property and tragically claiming three lives. Amounts of up to nearly 12 inches were reported in some areas and many small drainage basins flooded to record levels. Governor Voinovich's request to have 18 Ohio counties declared disaster areas was approved making them eligible for a wide range of federal and state disaster assistance. Those counties are: Adams; Athens; Brown; Clermont; Gallia; Hamilton; Highland; Hocking; Jackson; Lawrence; Meigs; Monroe; Morgan; Pike; Ross; Scioto; Vinton; and Washington.

Rain began falling shortly after midnight on March 1 and continued through mid-morning on March 2. The storm crossed through northern Kentucky and the southern half of Ohio covering a large area with more than 5 inches of rain. The heaviest rain was concentrated in northwestern Kentucky where amounts of nearly 14 inches were reported. In Ohio, the greatest amounts fell in the southern tier of counties, roughly south of a line from southern Clermont County through southern Pike County, across Vinton County, and into Hocking County. This entire area received more than 6 inches of rain. The hardest hit areas were in Adams, Brown, and Scioto counties where from 8 to nearly 12 inches of rain fell. Ripley (Brown County) reported 11.93 inches. Although rain amounts diminished rapidly to the north, 3 inch amounts fell on areas south and east of a line from near Cincinnati up to Licking County and 1 inch amounts from Darke County over to Knox County.

Runoff from this storm quickly brought small streams and rivers out of their banks. Flood levels rose rapidly, quickly inundating surrounding low-lying areas. River levels in many areas were the highest ever observed, easily surpassing 100-year flood elevations. Data is available from four existing stream gauges in the hardest hit areas. The Ohio Brush Creek near West Union (Adams County) gauge peaked at 31.15 feet, easily exceeding the previous peak of 27.91 feet set in March 1964 and the 100-year flood level of 27.35 feet. The Racoon Creek near Adamsville (Gallia County) gauge peaked at 29.11 feet, passing the previous peak of 28.69 feet set in May 1968 and the 100-year flood level of 28.7 feet. The Shade River near Chester (Meigs County) gauge peaked at 31.38 feet, easily surpassing the previous peak of 27.39 feet set in May 1968 and the 100-year flood level of 28.5 feet. The Whiteoak Creek at Georgetown (Brown County) gauge peaked at 9.4 feet which is slightly less than the 25-year flood level of 9.65 feet and well below the 20.87 feet peak of record.

Rain continued on and off through March 5 with another inch or so falling throughout much of the flood-stricken area. Although this did not contribute to additional flooding in the smaller drainage basins, it did slow the natural stream recession. The flash flooding in these smaller size basins was over, but the tributary creeks and rivers from Ohio, Kentucky, and West Virginia drained into the Ohio River which soon exceeded flood stage. The small basin drainage and the rising Ohio River level created backwater flooding on tributary streams. Flood stages on the Ohio River were exceeded from an area south of Marietta (Washington County) on downstream. The crest moved downstream passing Cincinnati early in the morning on March 6. Although substantially lower than the floods of record, levels in many locations were higher than have been seen in the last 30 to 50 years. At Portsmouth (Scioto County), the Ohio River crested on March 5 at 59.69 feet, about 2.4 feet below the 50-year flood elevation. At Cincinnati, the Ohio River crested on March 6 at 64.70 feet, about 2.4 feet below the 50-year flood elevation.

Nearly 10,700 homes, businesses and public buildings were damaged or affected in some way by the flood waters. At least 700 homes were destroyed. At the end of the month, nearly 10,000 applications have been filed for various types of disaster assistance.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

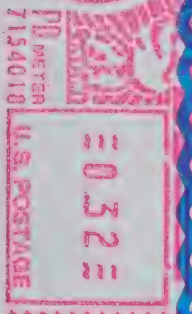
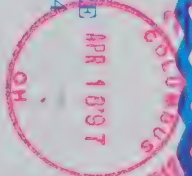
Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



Department
of Natural
Resources

DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



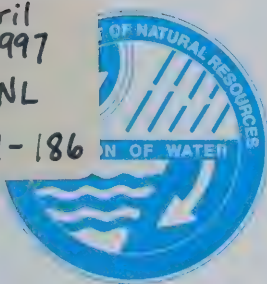
George V. Voinovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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April
1997
PNL
RI-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

April 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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MY 22 '97

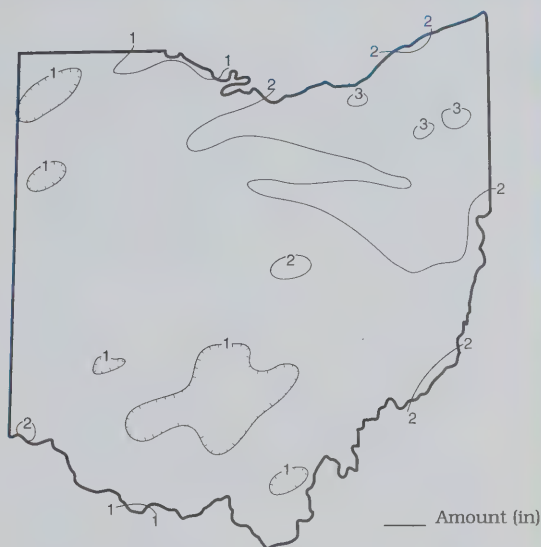
PRECIPITATION during April was noticeably below normal throughout the state. The state average was 1.65 inches, 1.86 inches below normal. This ranks as the ninth driest April during the past 115 years. Regional averages ranged from 2.41 inches, 0.98 inch below normal, for the Northeast Region to 1.22 inches, 2.09 inches below normal, for the Northwest Region. Warren (Trumbull County) reported the greatest amount of precipitation for the month, 3.28 inches. Patriot (Gallia County) reported the least amount, 0.50 inch.

Most of the precipitation during April fell as light rain showers. Although temperatures averaged well below normal throughout the month, snow amounts were nominal statewide. Also, little severe weather was reported, but high winds caused some damage in a few locations. Light showers crossed the state during 5-6 April with 0.25 to 0.50 inch rain amounts reported in most areas. The greatest precipitation for many locations fell during 12-13 April with 0.5 inch amounts falling in western Ohio increasing to more than one inch in the northeastern area of the state. The next two weeks of the month were rather dry with only around 0.25 inch or so of rain falling. Farmers were busy with spring field activities, a big difference from last year when constant rain showers delayed planting. Light showers returned to the state during 27-28 April with 0.25 to 0.5 inch amounts once again reported in most areas of the state.

Precipitation for the 1997 calendar is below normal throughout most of the state, but slightly above normal in the Northwest, North Central, South Central and Southeast regions. The state average is 11.13 inches, 0.76 inch below normal. Regional averages range from 15.76 inches, 1.78 inches above normal, for the South Central Region to 9.35 inches, 2.15 inches below normal, for the Central Hills Region. Many areas of the state have received below normal precipitation during three out of the four months so far in the 1997 calendar year.

Precipitation for the 1997 water year is above normal throughout most of the state with only the Central Region having below normal precipitation. The state average is 20.76 inches, 1.30 inches above normal. Regional averages range from 24.91 inches, 2.96 inches above normal, for the South Central Region to 18.01 inches, 1.33 inches below normal, for the Central Region.

PRECIPITATION APRIL 1997

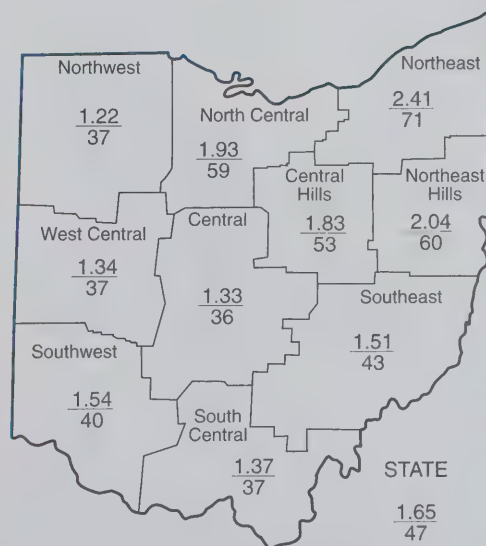


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -2.09 | +0.06 | +2.07 | +2.14 | -0.22 | +0.8 |
| North Central | -1.32 | +0.73 | +2.54 | +5.79 | +9.56 | +4.3 |
| Northeast | -0.98 | +0.04 | +1.77 | +10.08 | +14.36 | +3.7 |
| West Central | -2.24 | -1.22 | +1.27 | +5.14 | +15.31 | +1.8 |
| Central | -2.33 | -1.81 | -0.83 | +3.40 | +12.57 | +1.3 |
| Central Hills | -1.62 | -1.34 | +0.28 | +4.53 | +11.09 | +1.6 |
| Northeast Hills | -1.36 | -1.48 | -0.16 | +5.05 | +6.85 | +0.8 |
| Southwest | -2.27 | -0.28 | +1.17 | +9.09 | +20.64 | +2.4 |
| South Central | -2.37 | +2.63 | +3.38 | +9.44 | +14.52 | +3.3 |
| Southeast | -2.03 | +0.47 | +0.93 | +6.39 | +11.87 | +1.6 |
| State | -1.86 | -0.22 | +1.25 | +6.11 | +11.68 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

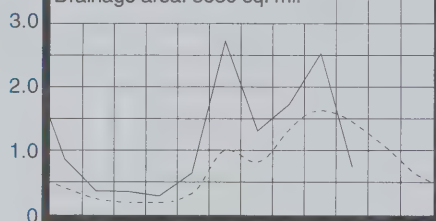
MEAN STREAM DISCHARGE

This Month

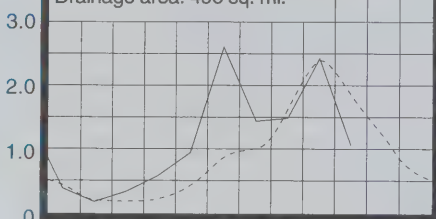
| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 956 | 67 | 107 | 134 | 140 |
| Great Miami River at Hamilton | 3,630 | 2,689 | 51 | 98 | 132 | 172 |
| Huron River at Milan | 371 | 403 | 78 | 139 | 189 | 179 |
| Killbuck Creek at Killbuck | 464 | 384 | 51 | 100 | 152 | 166 |
| Little Beaver Creek near East Liverpool | 496 | 528 | 59 | 89 | 123 | 125 |
| Maumee River at Waterville | 6,330 | 3,689 | 39 | 122 | 143 | 150 |
| Muskingum River at McConnelsville | 7,422 | 7,178 | 47 | 91 | 119 | 143 |
| Scioto River near Prospect | 567 | 245 | 30 | 93 | 140 | 158 |
| Scioto River at Higby | 5,131 | 3,575 | 51 | 103 | 124 | 173 |
| Stillwater River at Pleasant Hill | 503 | 323 | 45 | 92 | 128 | 144 |

MEAN STREAM DISCHARGE

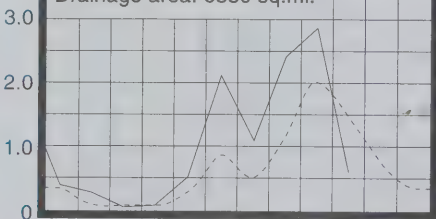
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



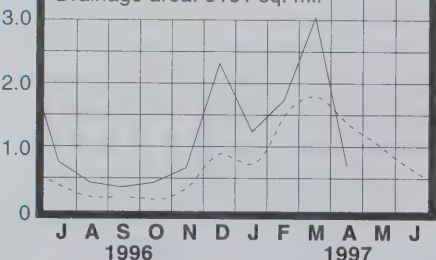
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



Base period for all streams: 1961-1990

STREAMFLOW during April was noticeably below normal throughout the state. Flows in all areas of the state except north-central and extreme north-eastern Ohio were low enough to be considered deficient. Flows during April were noticeably less than the flows observed during March.

Flows at the beginning of the month were below normal in most areas of the state, but above normal in the drainage basins located in north-central and extreme northeastern Ohio. Most drainage basins in the western half of the state had their greatest flows for April on the first day of the month. Flows declined during the first two weeks of the month with northeastern Ohio streams having their lowest flows on 11 April.

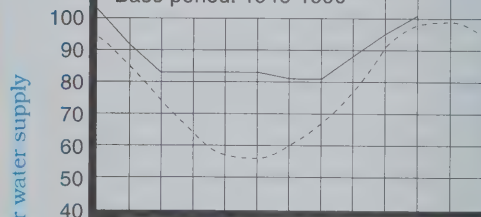
Flows statewide increased following precipitation that fell during 12-13 April. Drainage basins in the eastern half of the state had their greatest flows for the month on 13-14 April following this precipitation. Flows then declined again until a few days before the end of the month. Most areas of the state had their lowest flows for the month around 27 April. Flows at the end of the month were noticeably below normal throughout the state.

RESERVOIR STORAGE for water supply during April increased in the Mahoning River basin and decreased in the Scioto River basin. Storage remained above normal in both basins.

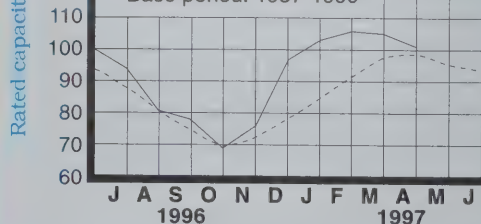
Reservoir storage at the end of April in the Mahoning basin index reservoirs was 101 percent of rated capacity for water supply compared with 95 percent for last month and 117 percent for April 1996. Month-end storage in the Scioto basin index reservoirs was 101 percent of rated capacity for water supply compared with 105 percent for last month and 108 percent for April 1996. Surface water supplies continue to remain in good condition throughout the state.

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



Normal - - - - - Current - - - - -

GROUND-WATER LEVELS

GROUND WATER LEVELS during April showed mixed responses across the state. Levels in shallow, unconsolidated aquifers declined throughout the month in response to the below normal precipitation. Levels in most consolidated and in deep, unconsolidated aquifers were stable or rose slightly during April, still receiving some delayed recharge from the above normal precipitation during March. Typically, levels in all aquifers are continuing to rise during April.

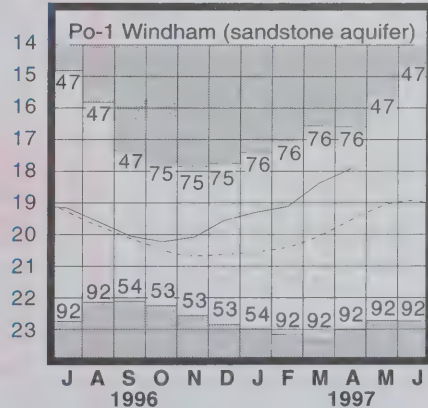
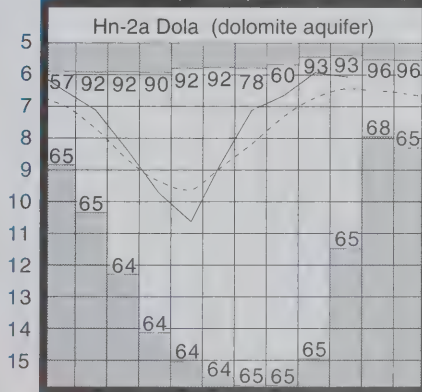
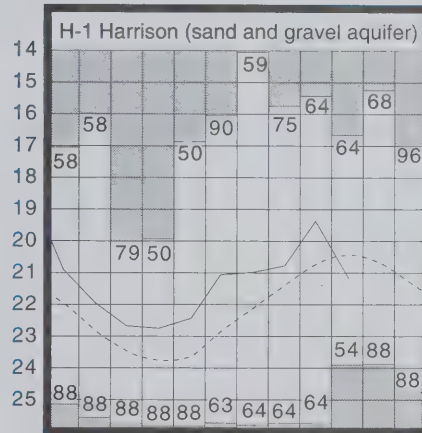
Ground water supplies continue to remain in good condition throughout the state; however, precipitation during April was inadequate to continue the favorable improving trend that has been observed during the past several months. Levels have fallen to below normal in many unconsolidated aquifers, but these can still respond favorably to adequate precipitation during the next month or two. Levels in aquifers across the southern half of the state are now lower than they were a year ago while levels in northern Ohio aquifers continue to remain higher than last year's levels. Adequate precipitation throughout the upcoming growing season and summer high-demand period will help maintain favorable ground water conditions.

LAKE ERIE level rose during April. The mean level was 573.69 feet (IGLD-1985), 0.17 foot above last month's mean level and 2.30 feet above normal. This month's level is 2.00 feet above the April 1996 level and 4.49 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during April averaged 1.7 inches, 1.4 inches below normal. The entire Great Lakes basin averaged 1.5 inches of precipitation during April, 1.0 inch below normal. For calendar year 1997 through April, the Lake Erie basin has averaged 9.9 inches of precipitation, 2.1 inches below normal, and the entire Great Lakes basin has averaged 9.8 inches, 1.2 inches above normal.

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 13.89 | -1.46 | -1.17 | -0.68 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.33 | -0.59 | -0.34 | -0.60 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 40.94 | +1.46 | +0.28 | -0.09 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.18 | -0.75 | -1.81 | -0.38 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.07 | +0.40 | -0.14 | +0.28 |
| Po-1 | Windham, Portage Co. | Sandstone | 17.91 | +1.61 | +0.49 | +2.25 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 12.60 | -1.80 | -0.67 | +0.24 |

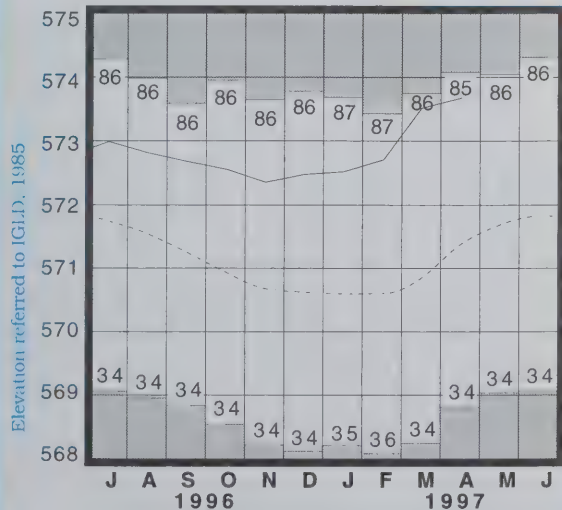
GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

☐ Record high and low, year of occurrence

Normal - - - - Current ————

SUMMARY

Precipitation was noticeably below normal throughout Ohio with the state average of 1.65 inches ranking as the ninth driest April during the past 115 years. Streamflow was below normal throughout the state. Reservoir storage remained at above-normal seasonal levels. Ground water levels declined in shallow aquifers and was stable or rose slightly in deep aquifers. Lake Erie level rose 0.17 foot and was 2.30 feet above the long-term April average.

NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Shelby County
by Michael P. Angle

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00.

DIVISION OF WATER PUBLICATIONS DIRECTORIES

Directories of the Division of Water publications are once again available. Two different versions have been prepared. The first, entitled "Current Division of Water Publications," contains a listing of those publications which are currently in print or frequently requested. This version is available at no charge while supplies last. The second, entitled "A Complete List of Division of Water Information and Publications," contains a listing of all Division of Water publications including old and out-of-print material. The complete list presents Division of Water publications both by subject and by geographic area. The complete listing costs \$5.00.

These new publications are available at the Division of Water or can be ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

| Cost of Publications | Add |
|----------------------|---------|
| under \$10.01 | \$2.50 |
| \$10.01 - \$20.00 | \$3.75 |
| \$20.01 - \$50.00 | \$6.00 |
| \$50.01 - \$100.00 | \$8.50 |
| \$100.01 and over | \$10.00 |

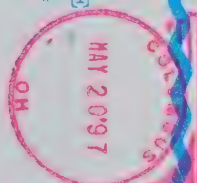
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Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



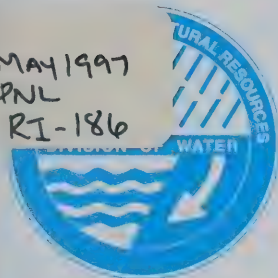
George V. Voimovich
GOVERNOR

Donald C. Anderson
DIRECTOR

Michelle Willis
Chief

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MAY 1997
PNL
RI-186



MONTHLY WATER INVENTORY REPORT FOR OHIO

May 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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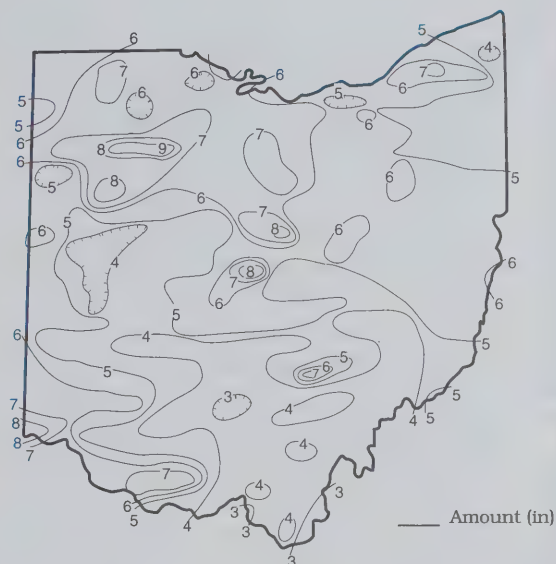
PRECIPITATION during May was above normal throughout most of Ohio, but slightly below normal in the South Central Region. The state average was 5.31 inches, 1.56 inches above normal. Regional averages ranged from 6.98 inches, 3.44 inches above normal, for the Northwest Region to 3.72 inches, 0.21 inch below normal, for the South Central Region. This was the second wettest May during the past 106 years for the Northwest and North Central regions. Findlay (Hancock County) reported the greatest amount of precipitation for the month, 9.40 inches; Ottawa (Putnam County) reported 9.31 inches. Chillicothe (Ross County) reported the least amount of May precipitation, 2.90 inches, the only location reporting less than 3 inches for the month.

Precipitation fell during every week of the month, but the middle of the month was somewhat drier in many areas, especially in the southern half of the state. The month started with heavy rain on May 1-2 throughout the state. Nearly every area received at least 1 inch of much needed rain after a dry April. Southwestern, northwestern and north-central Ohio received in excess of 1.5 inches with some locations reporting more than 2 inches. Scattered showers fell across the state during May 5, 8, and 14 to 16. Generally, about 0.5 to 1 inch fell during the May 5 and 8 period and less than 0.5 inch fell during the May 14 to 16 period. Heavier storms returned to the state during May 18-19 with 0.5 to 1 inch falling in many areas. A few exceptions occurred in extreme southern Ohio, especially in Adams County, where more than 3 inches fell causing localized flash flooding in some areas. The last week of the month was wet in many areas of Ohio. Heavy storms crossed northern and eastern Ohio during May 24-25 with some locations reporting more than 2 inches of rain. Showers from a slow moving storm system began to fall on May 29 and continued to fall on and off for several days. Steady, soaking showers fell throughout May 31 on soils near saturation in some areas of the state. This triggered some flooding which will be reported in the June issue of this publication.

Precipitation for the 1997 calendar year is above normal throughout most of the state, but below normal in the Central, West Central, and Northeast Hills regions. The state average is 16.44 inches, 0.80 inch above normal. Regional averages range from 19.48 inches, 1.57 inches above normal, for the South Central Region to 14.22 inches, 1.12 inches below normal, for the West Central Region.

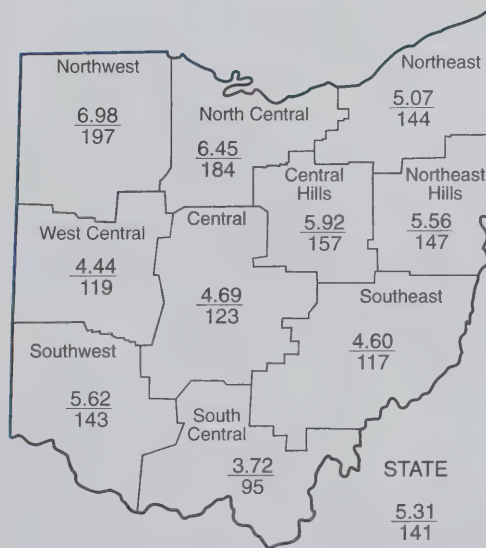
Precipitation for the 1997 water year is above normal throughout most of the state with only the Central Region having slightly below normal precipitation. The state average is 26.06 inches, 2.85 inches above normal. Regional averages range from 28.63 inches, 2.75 inches above normal, for the South Central Region to 22.70 inches, 0.45 inch below normal, for the Central Region.

PRECIPITATION MAY 1997



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +3.44 | +1.64 | +4.55 | +4.97 | +3.02 | +3.1 |
| North Central | +2.94 | +2.25 | +5.07 | +8.45 | +11.11 | +5.3 |
| Northeast | +1.54 | +1.25 | +2.02 | +11.07 | +15.06 | +4.8 |
| West Central | +0.72 | -0.74 | +0.92 | +2.76 | +12.94 | +3.5 |
| Central | +0.88 | -0.46 | -0.57 | +0.59 | +10.97 | +2.8 |
| Central Hills | +2.15 | +0.97 | +1.94 | +5.24 | +11.46 | +3.6 |
| Northeast Hills | +1.78 | +0.80 | +0.89 | +5.17 | +7.23 | +2.1 |
| Southwest | +1.70 | +2.00 | +2.30 | +4.72 | +17.27 | +3.5 |
| South Central | -0.21 | +3.34 | +2.22 | +4.69 | +10.91 | +2.7 |
| Southeast | +0.66 | +1.94 | +0.84 | +3.27 | +9.57 | +1.6 |
| State | +1.56 | +1.30 | +2.02 | +5.10 | +10.98 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 1,419 | 230 | 119 | 121 | 137 |
| Great Miami River at Hamilton | 3,630 | 3,631 | 93 | 84 | 119 | 136 |
| Huron River at Milan | 371 | 830 | 310 | 130 | 189 | 179 |
| Killbuck Creek at Killbuck | 464 | 616 | 124 | 102 | 136 | 144 |
| Little Beaver Creek near East Liverpool | 496 | 818 | 141 | 90 | 123 | 115 |
| Maumee River at Waterville | 6,330 | 11,084 | 219 | 124 | 149 | 140 |
| Muskingum River at McConnelsville | 7,422 | 10,210 | 104 | 87 | 108 | 123 |
| Scioto River near Prospect | 567 | 440 | 105 | 94 | 130 | 131 |
| Scioto River at Higby | 5,131 | 4,737 | 90 | 97 | 120 | 136 |
| Stillwater River at Pleasant Hill | 503 | 437 | 113 | 86 | 120 | 119 |

STREAMFLOW during May was above normal throughout most of the state, but slightly below normal in southwestern and south-central Ohio. Flows in the northern area of the state were high enough to be considered excessive. Flows during May were greater than the flows observed during April, an unusual occurrence.

Flows at the beginning of the month were noticeably below normal throughout the state. Most drainage basins had their lowest flows for the month on May 2 although some basins had slightly lower flows around May 18. In southwestern Ohio, the lowest flows occurred on May 24. Flows increased statewide following precipitation during the first week of the month. This rain resulted in the greatest flows for May in the south-central and southwestern areas of the state. Generally,

flows then declined through the third week of the month with slight rises noted after local precipitation. Locally severe storms during May 18-19 in extreme southern Ohio produced flash flooding conditions in portions of Adams County, an area previously hit by the floods of early March 1997. Widespread storms on May 25, especially in the northern half of the state, brought the month's greatest flows to nearly every drainage basin. Heavy rain from a slow moving storm system began falling on May 29-31 and rivers were rising rapidly to noticeably above normal levels in many areas of Ohio at the end of the month. Significant flooding followed these storms which will be summarized in the June issue of this report.

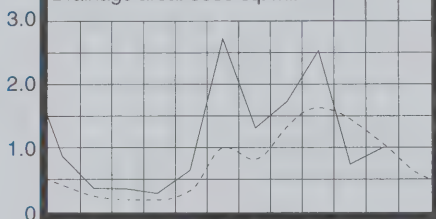
RESERVOIR STORAGE for water supply during May increased sharply in both the Mahoning and Scioto river basin reservoirs. Month-end storage was noticeably above normal in both basins.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 116 percent of rated capacity for water supply compared with 101 percent for last month and 101 percent for May 1996. Month-end storage in the Scioto basin index reservoirs was 115 percent of rated capacity for water supply compared with 101 percent for last month and 104 percent for May 1996. Surface-water supplies in both on- and off-stream reservoirs are in a favorable position for this time of the year throughout the state. Recreational reservoirs are at or above their normal summer pool elevations.

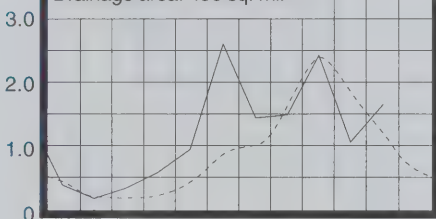
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)

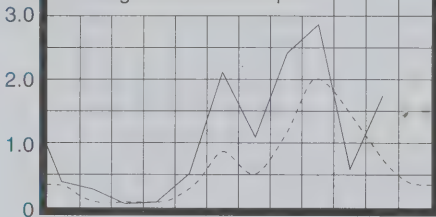
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



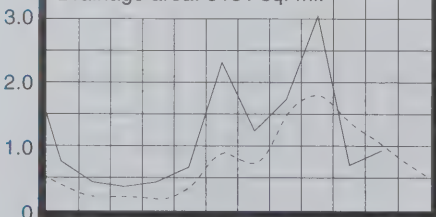
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



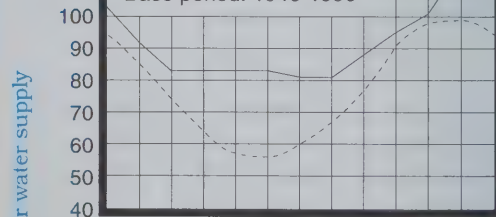
SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



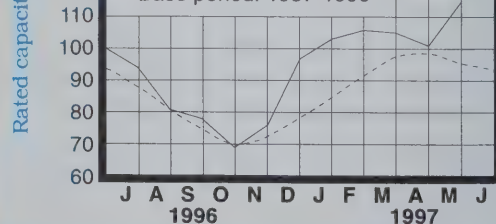
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



Normal - - - - Current ———

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

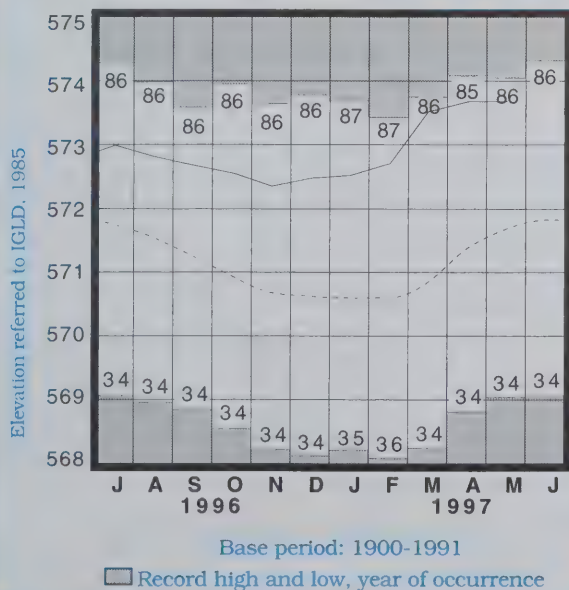
GROUND WATER LEVELS during May declined in most aquifers. A few exceptions were noted in some aquifers in northern Ohio. Generally, levels in aquifers in the southern half of the state declined throughout the month while levels in the northern half of the state declined through just past mid-month and then began to rise.

Ground water levels have fallen to below normal in many aquifers in some southern and eastern areas of the state, but remain above normal throughout most of northern Ohio. In addition, levels in most aquifers are also lower than they were a year ago. Even with these below-normal levels, ground water supplies continue to remain in good condition. Adequate precipitation and below normal temperatures have reduced demand. Abundant precipitation at the end of May should provide for some improvement in ground water supplies during June. At the end of May the Ohio Agricultural Statistics Service reported that soil moisture was rated as being short in 1 percent of the state, adequate in 49 percent of the state, and surplus in 50 percent of the state.

LAKE ERIE level was unchanged during May. The mean level was 573.69 feet (IGLD-1985), the same level as last month and 2.00 feet above the May normal level. This month's level is 1.35 feet above the May 1996 level and 4.49 feet above Low Water Datum.

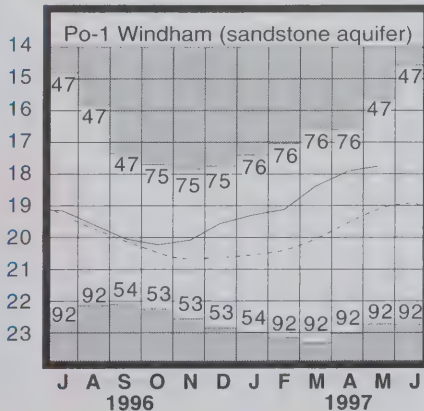
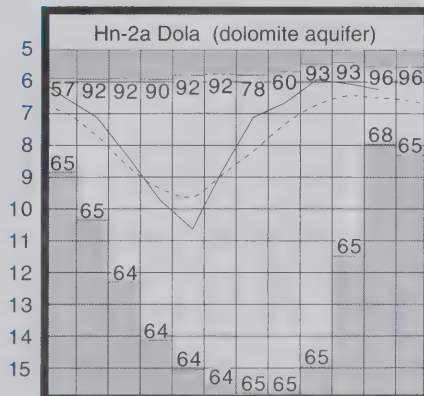
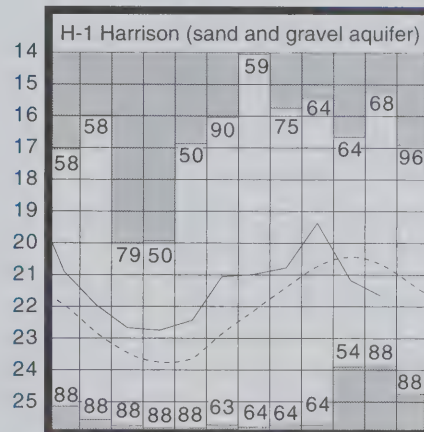
The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during May averaged 5.2 inches, 1.9 inches above normal. The entire Great Lakes basin averaged 3.0 inches of precipitation during May, which is normal. For calendar year 1997 through May, the Lake Erie basin has averaged 16.7 inches of precipitation, 3.0 inches above normal, and the entire Great Lakes basin has averaged 12.8 inches, 1.2 inches above normal.

LAKE ERIE LEVELS at Fairport



GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990

Record high and low, year of occurrence

Precipitation was above normal throughout most of the state, but slightly below normal in the South Central Region. Streamflow was above normal in most areas of the state, but slightly below normal in south-central and southwestern Ohio. Reservoir storage increased and continued to remain at above-normal levels. Ground water levels declined in nearly all aquifers. Lake Erie level was stable and was 2.00 feet above the long-term May average.

NOTES AND COMMENTS

HIGH LEVELS ON LAKE ERIE PROMPT GOVERNOR VOINOVICH TO TAKE ACTION

Concerned that Lake Erie's water level is rising and is expected to be near record-high levels for the foreseeable future, Governor George V. Volnovich has directed the Ohio Department of Natural Resources (ODNR) and the Ohio Emergency Management Agency (Ohio EMA) to take immediate action to deal with an increased threat of flooding and erosion along Ohio's 262-mile Lake Erie coast. These two agencies will coordinate the state's response to this threat by working with coastal residents and local officials. In addition, the Governor has requested assistance from the U. S. Army Corps of Engineers, Buffalo District, asking for the implementation of their "Advanced Measures Assistance" program. Through the "Advanced Measures Assistance" program, the Corps will provide technical support, construct temporary protective measures and supply flood-fighting material and equipment such as sandbags, polyethylene sheeting, pumps, lumber and stone.

Specifically, the Governor directed ODNR and Ohio EMA to: coordinate with local officials and government agencies preparedness and mitigation measures necessary for flood and erosion protection; help identify and prioritize areas most at risk for flooding and erosion and provide information, technical assistance and public outreach; begin a public awareness program to inform coastal residents and local officials about this situation and ways to respond including information about the federal flood insurance program; establish a toll-free help line to provide information on high water levels, coastal erosion, flood protection, erosion control permit requirements and flood insurance (That number is 1-888-644-6267); and to coordinate the permit requirements for construction of coastal protection structures and to expedite the process.

Below normal precipitation during April throughout the Great Lakes basin slowed the rising lake levels, but the biggest threat for flooding and erosion is from storms with high winds that can push the lake level up several feet. Although the current lake level is several inches below the record-high levels reached during the mid-1980s, long-range forecasts indicate that the lake could remain high for the next several years.

OHIO STREAM MANAGEMENT GUIDES NOW AVAILABLE

The Ohio Department of Natural Resources (ODNR) announces the availability of ten facts sheets in a series called "Ohio Stream Management Guides." The series covers a variety of watershed and stream management issues and methods of addressing stream-related problems. More Guides are in production and will be released as they are printed.

Single copies are available free of charge from the ODNR Public Information Center, 1952 Belcher Drive, Building C-1, Columbus, Ohio 43224-1386 614/265-6791. You may also e-mail your inquiries to ODNR at "infomail@dnr.state.oh.us". For more information about the project, call the ODNR, Division of Water at 614/265-6750.

Index to the Ohio Stream Management Guides

An Introduction to Stream Management: An overview of land use and stream resources interactions.

Permit Checklist for Stream Modification Projects: An overview of permits, requirements and consultations for projects in stream environments.

Restoring Streambanks with Vegetation: Planting guide for dormant willow cuttings (or other rapidly-rooting species) to resist streambank erosion.

Trees for Ditches: Guidelines on species selection, planting locations and maintenance to achieve environmental and economic benefits while maintaining drainage capacity.

A Stream Management Model: A walk-through guide to the stream management display and demonstration at the Ohio Farm Science Review's Gwynne Conservation Area.

Biotechnical Projects in Ohio: Maps and briefly describes 52 projects using biotechnical practices. Biotechnical practices use vegetative or other natural materials to achieve stream management objectives, usually erosion control.

Tree Kickers: Construction guidelines for uses hardwood logs anchored to a bank at an angle to “kick” stream flow away from an undercutting problem.

Evergreen Revetments: Construction guidelines for a buffer system made of cut evergreen trees attached to each other and anchored into an eroded streambank.

Who Owns Ohio Streams?: Provides an overview of landowner rights and responsibilities and the authorities and duties of government regarding surface water rights.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Correspondency District: U.S. Army Corps of Engineers, Mucklingum Area.

Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources
Division.

Lake Erie level data:

*U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:*

U.S. Department of Commerce, National
Oceanic and Atmospheric Administration,
National Weather Service.



DIVISION OF WATER
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COLUMBUS, OHIO 43224

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MONTHLY WATER INVENTORY REPORT FOR OHIO

June 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

AG 5 97

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June 1997
I-186
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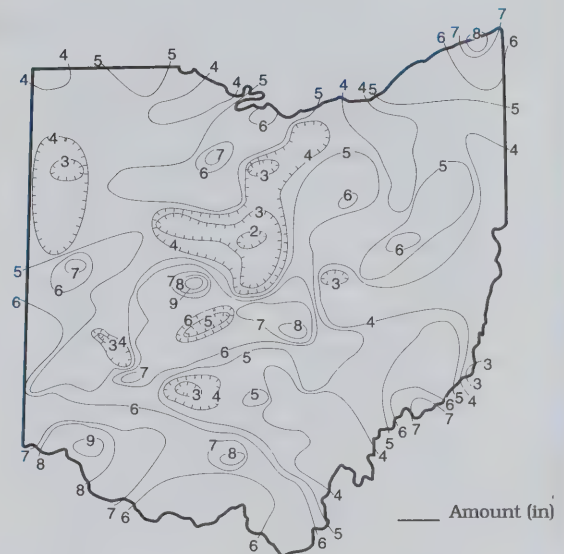
PRECIPITATION during June was above normal throughout most of the state, but below normal in portions of north-central Ohio and in a few other scattered, isolated areas. The state average was 4.99 inches, 1.03 inches above normal. Regional averages ranged from 5.82 inches, 1.76 inches above normal, for the Central Region to 4.24 inches, 0.41 inch above normal, for the Northwest Region. Perrintown (Clermont County) reported the greatest amount of precipitation for the month, 9.57 inches. In the Central Region, Marysville (Union County) reported 9.01 inches and several unofficial observers reported amounts of more than 10 inches at many locations in the central Ohio area. Mt Gilead (Morrow County) reported the least amount of June precipitation, only 1.24 inches. This was the only location reporting less than 2 inches of rain for the month.

June started as May ended with heavy rain falling in many areas of the state. Nearly all areas received at least 1 inch of rain during June 1-2 with some areas receiving more than 5 inches. The heaviest amounts were reported in portions of central and southern Ohio, but some areas in the north-central and northeastern areas of the state also received similar amounts. Significant flooding, especially in the Scioto River basin, resulted from these storms. Flooding was also significant along the Blanchard River and in some of the tributaries that drain directly into the Ohio River or Lake Erie. Rain showers continued on and off throughout the week in some areas. The second week of the month was more typical of June with most areas reporting around 0.5 inch with 1 inch amounts falling at some locations from storms during June 8-9 and 13-14. Stronger storms were more common statewide during June 16-18 with another inch or so falling in most areas of the state and 2 inches at some locations in southwestern Ohio. Many areas received some welcome drying the last ten days of the month. Generally, less than 0.5 inch of rain was reported during this period in most areas, but some locations in northern Ohio received about 1 inch of rain. Overall, temperatures were below normal during the first half of the month but warmed up noticeably during the second half.

Precipitation for the 1997 calendar year is above normal throughout Ohio. The state average is 21.40 inches, 1.80 inches above normal. Regional averages range from 24.22 inches, 2.43 inches above normal, for the South Central Region to 19.76 inches, 0.38 inch above normal, for the West Central Region.

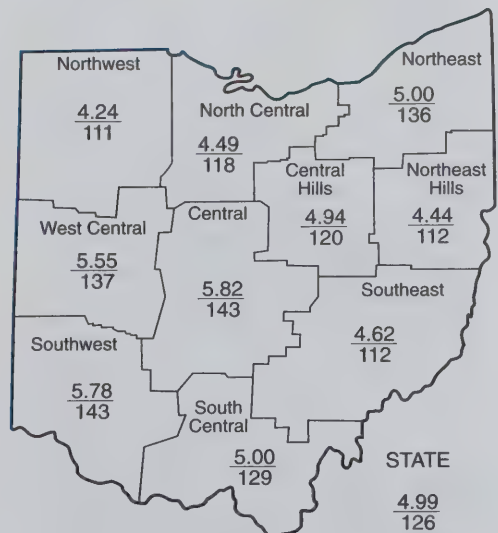
Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 31.02 inches, 3.85 inches above normal. Regional averages range from 33.72 inches, 3.98 inches above normal, for the Southwest Region to 28.59 inches, 1.38 inches above normal, for the Central Region.

PRECIPITATION JUNE 1997



PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.41 | +1.76 | +3.90 | +4.58 | +3.31 | +2.9 |
| North Central | +0.67 | +2.29 | +4.04 | +8.54 | +12.45 | +4.5 |
| Northeast | +1.32 | +1.88 | +2.24 | +10.73 | +16.51 | +3.3 |
| West Central | +1.51 | -0.03 | +0.38 | +4.14 | +14.13 | +2.7 |
| Central | +1.76 | +0.37 | +0.27 | +2.22 | +11.17 | +1.7 |
| Central Hills | +0.83 | +1.34 | +0.81 | +5.16 | +12.12 | +2.9 |
| Northeast Hills | +0.48 | +0.99 | +0.33 | +4.21 | +7.40 | +1.9 |
| Southwest | +1.73 | +1.15 | +2.66 | +4.64 | +18.68 | +3.2 |
| South Central | +1.12 | -1.46 | +2.43 | +4.31 | +11.73 | +3.3 |
| Southeast | +0.48 | -0.95 | +0.87 | +2.91 | +9.33 | +1.7 |
| State | +1.03 | +0.73 | +1.80 | +5.15 | +11.71 | |



*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 2,135 | 821 | 175 | 131 | 146 |
| Great Miami River at Hamilton | 3,630 | 8,634 | 371 | 107 | 120 | 137 |
| Huron River at Milan | 371 | 905 | 523 | 208 | 191 | 192 |
| Killbuck Creek at Killbuck | 464 | 1,057 | 402 | 120 | 121 | 148 |
| Little Beaver Creek near East Liverpool | 496 | 977 | 312 | 114 | 116 | 119 |
| Maumee River at Waterville | 6,330 | 12,813 | 563 | 134 | 152 | 144 |
| Muskingum River at McConnelsville | 7,422 | 15,940 | 268 | 100 | 109 | 122 |
| Scioto River near Prospect | 567 | 1,229 | 462 | 105 | 109 | 143 |
| Scioto River at Higby | 5,131 | 13,950 | 399 | 112 | 118 | 139 |
| Stillwater River at Pleasant Hill | 503 | 1,557 | 581 | 133 | 130 | 137 |

STREAMFLOW during June was noticeably above normal throughout Ohio and high enough to be considered excessive statewide. Flows during June were greater than the flows observed during May. The monthly mean flow of 13,950 cfs for the Scioto River at Higby gauging station was the highest for June for its period of record.

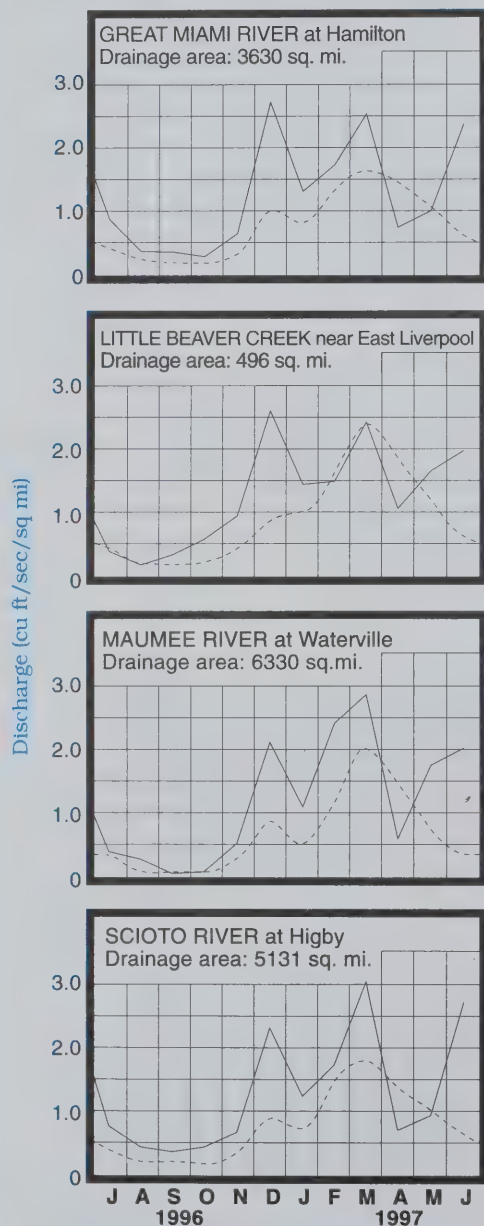
Flows at the beginning of the month were responding to widespread precipitation that fell during the last few days of May and were markedly above normal throughout the state. Heavy rain continued to fall during June 1-2 and flows continued to increase in many areas of the state, especially in central and southern Ohio where significant flooding occurred. Significant flooding also occurred in other areas including the Blanchard River in Hancock and Putnam counties and in

some of the streams that drain directly into Lake Erie or the Ohio River. Drainage basins in southwestern Ohio had their greatest flows for June at the beginning of the month while the greatest flows for the remainder of the state generally occurred on June 3, or a day or two later along the Scioto River in southern Ohio as this floodwater moved downstream. Flows in some streams in the Scioto River basin were the highest in nearly 40 years. Generally, flows declined through the end of the month with slight increases noted after mid-month following some locally heavy precipitation. Lowest flows for June occurred a few days before the end of the month in most drainage basins and at the end of the month in the eastern area of the state. Flows at the end of the month remained above normal statewide.

RESERVOIR STORAGE for water supply during June declined in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

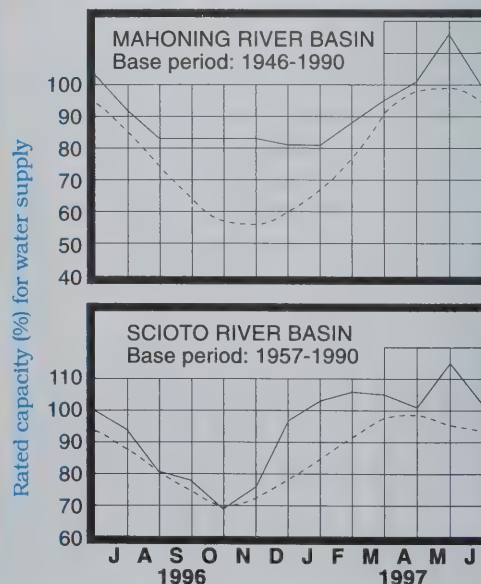
Reservoir storage at the end of June in the Mahoning basin index reservoirs was 99 percent of rated capacity for water supply compared with 116 percent for last month and 103 percent for June 1996. Month-end storage in the Scioto basin index reservoirs was 102 percent of rated capacity for water supply compared with 115 percent for last month and 100 percent for June 1996. Surface water supplies continue to remain in good condition throughout the state.

MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 16.30 | -2.39 | -0.56 | -4.23 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.37 | -0- | +0.21 | -0.96 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 41.46 | +1.59 | -0.21 | -1.48 |
| H-1 | Harrison, Hamilton Co. | Gravel | 19.79 | +1.51 | +1.87 | -1.27 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 5.77 | +0.86 | +0.49 | +0.03 |
| Po-1 | Windham, Portage Co. | Sandstone | 17.48 | +1.44 | +0.29 | +1.60 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 11.91 | -0.02 | +1.03 | -0.51 |

GROUND WATER LEVELS during June showed net improvement in most aquifers. A few exceptions were noted in aquifers in the central area of the state. Generally, levels in most aquifers are showing a natural decline during June. Ground water levels in most sand and gravel aquifers rose early in the month and then declined until the end of the month. Consolidated aquifers showed mixed responses with levels in some being stable with slight rises early while others were stable or slowly declined throughout the month. Observation well Hn-2a (near Dola, Hardin County), representing limestone and dolomite aquifers in northwestern Ohio, reached a record-high level during the month.

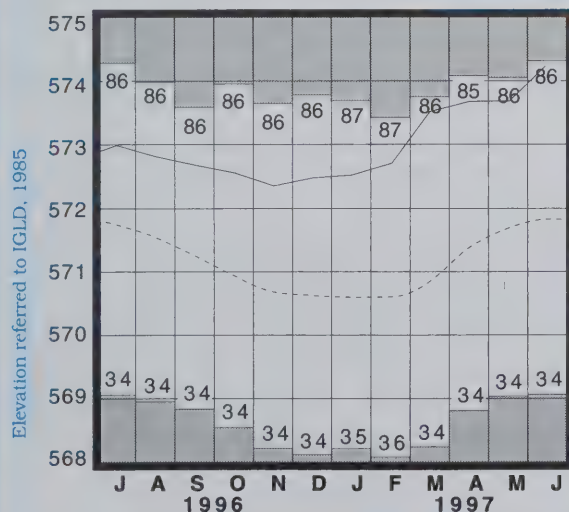
The above normal precipitation during May and June has been beneficial for ground water supplies. Ground water levels are near or above normal in most areas of the state. Although levels are lower than they were a year ago in most aquifers, ground water supplies continue to remain in good condition throughout the state. Hydrologic and climatic conditions have been favorable for reducing the seasonal demand on both public and private water supplies. At the end of June (7-4-97), the Ohio Agricultural Statistics Service reports that soil moisture is rated as being short in 3 percent of the state, adequate in 73 percent of the state, and surplus in 24 percent of the state.

LAKE ERIE level rose to a near-record high during June. The mean level was 574.25 feet (IGLD-1985), 0.56 foot above last month's mean level and 2.43 feet above normal. This month's level is 1.48 feet above the June 1996 level and 5.05 feet above Low Water Datum.

The June 1997 Lake Erie level was only 0.06 foot below the record-high level at Fairport established in June 1986. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain well above the long-term average for the next several months. Projected levels are expected to remain below the record-high levels established during the mid 1980s, but could approach these levels if precipitation in the Lake Erie and other Great Lake's basins is noticeably above normal for an extended period.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during June averaged 3.6 inches, 0.2 inch above normal. The entire Great Lakes basin averaged 3.1 inches of precipitation during June, 0.1 inch below normal. For calendar year 1997 through June, the Lake Erie basin has averaged 18.7 inches of precipitation, 1.6 inches above normal, and the entire Great Lakes basin has averaged 15.9 inches, 1.1 inches above normal.

LAKE ERIE LEVELS at Fairport

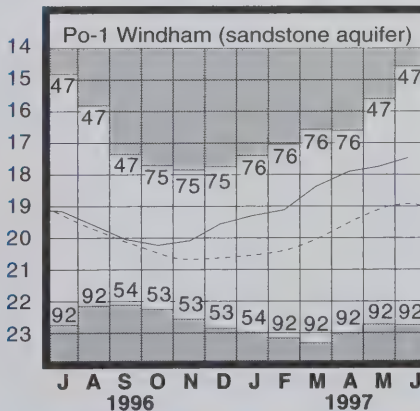
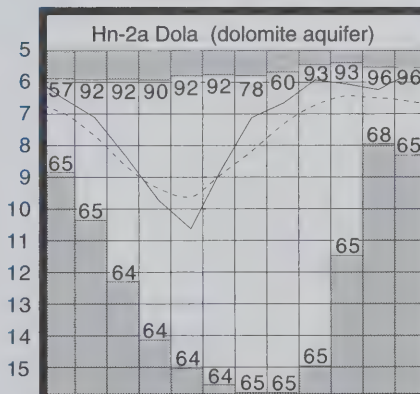
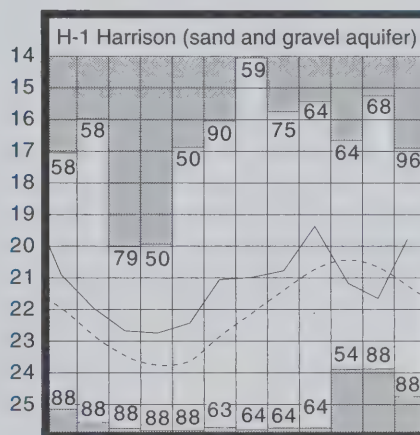


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

SUMMARY

Precipitation was above normal throughout most of the state, but below normal in portions of north-central Ohio. Streamflow was noticeably above normal throughout the state with significant flooding during the first week of the month. Reservoir storage declined but remained above normal statewide. Ground water levels in most aquifers showed net improvement and are near or above normal in most areas of the state. Lake Erie level rose to a near-record high and was 2.43 feet above the long-term June average.

NOTES AND COMMENTS

FIELD WORKSHOP ON JOINTS AND FRACTURES IN OHIO TILLS

A one-day field demonstration entitled "Field Workshop on Joints and Fractures in Ohio Tills: Site Investigation Techniques and Field Hydraulic Measurements" is being sponsored by numerous agencies and organizations including the Ohio Academy of Science, the Association of Ohio Pedologists, Bowser-Morner Inc., and Bennett & Williams Environmental Consultants, Inc. In addition, numerous other agencies will be participating including the Ohio Department of Natural Resources Division of Water, The Ohio State University, Indiana University/Indiana Geological Survey, the Natural Resources Conservation Service, and the U.S. Department of Agriculture. The workshop will be held on Thursday, August 28, 1997 from 8 a.m. to 4:15 p.m. at The Ohio State University Molly Caren Agricultural Center near London, Ohio, the site of the annual Farm Science Review.

The workshop will be focusing on joints (fractures) in glacial till and on the latest methodologies for investigating and testing these features. Implications and importance of fractures will also be discussed. Demonstrations will include: (1) several methods of drilling cores, installing monitor wells, and logging and examining core; (2) construction and examination of large test pits; and (3) various resistivity and gamma-logging surveys. There will also be numerous demonstrations on various methods for determining in-field hydraulic conductivity.

The cost to attend the workshop is \$40 (\$25 for students) which will include all hand-out materials and lunch. The number of participants will be limited to about 75 people. For additional information and registration materials contact Scott Brockman, ODNR, Division of Geological Survey at (614)265-7054 or Mike Angle, ODNR, Division of Water (614)265-6895.

NEW PUBLICATIONS

The U.S. Geological Survey, Water Resources Division announces the availability of the following new publications:

Results of the Basewide Monitoring Program at Wright-Patterson Air Force Base, Ohio, 1993-1994 (U.S. Geological Survey Water-Resources Investigations Report 96-4125)

by Charles W. Schalk, William L. Cunningham, and others

This report summarizes an extensive, supplemental, analytical sampling program to collect geologic and hydrologic data at Wright-Patterson Air Force Base (WPAFB) and the results of an investigation to determine the effects of base activities on regional water quality.

WPAFB is an 8,500-acre facility on the National Priorities List. The sampling program was designed to assess the regional effects of the numerous waste sites located throughout the base. Multiple sampling was done for a broad variety of chemical constituents in the ground water, surface water, and streambed sediments. Results indicate that minimal contamination amounts were found and that, on a regional scale, contamination of waters and sediments on WPAFB is not extensive.

Hydrologic Disturbance and Response of Aquatic Biota in Big Darby Creek Basin, Ohio (U.S. Geological Survey Water Resources Investigations Report 96-4315)

by J. A. Hambrook, G. F. Koltun, B. B. Palcsak, and J. S. Tertuliani

This report discusses the effects of flood-related disturbances on larval aquatic-insect and algal communities at selected locations within the Big Darby Creek Basin.

Big Darby Creek, parts of which have National and State scenic river designation, is one of the most biologically diverse streams of its size in the Nation. The sampling program was designed to assess the washout and recolonization of macroinvertebrates and algae associated with a spring and summer storm. Related factors, such as streamflow magnitude, shear stress, and streambed disturbance were considered when interpreting observed changes in densities and community structure of these organisms.

A limited number of these two new publications are available from the U.S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43224-3192, phone (614) 469-5553.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data:

U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index;

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



Department
of Natural
Resources

DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



George V. Voinovich
Governor

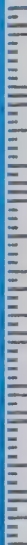
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Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

July 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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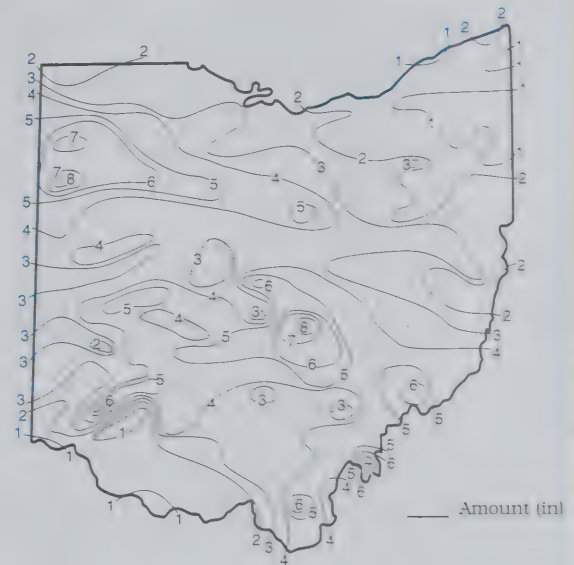
PRECIPITATION during July was slightly below normal throughout most of Ohio, but above normal in the central and northwestern areas of the state. The state average was 3.34 inches, 0.58 inch below normal. Regional averages ranged from 4.49 inches, 0.53 inch above normal, for the Central Region to 1.30 inches, 2.38 inches below normal, for the Northeast Region. This was the third driest July during the past 103 years in the Northeast Region. Buckeye Lake (Licking County) reported the greatest amount of precipitation for the month, 8.86 inches. Also reporting more than 8 inches for the month was Van Wert (Van Wert County) which recorded 8.31 inches. Milford (Clermont County) reported the least amount of precipitation during July, 0.42 inch. A few other locations in southwestern Ohio and numerous locations in northeastern Ohio reported less than 1 inch of rain during July.

Precipitation during July fell as showers and thundershowers with locally severe weather reported in many areas. Most of the precipitation fell during the first and last ten days of the month as the middle of July was rather dry in most locations. Strong storms crossed the southern half of the state during July 1-2 with some areas reporting more than 2 inches of rain. During the next wet period, northwestern Ohio received the most precipitation, more than 2 inches, from storms during July 8-9. Most areas of Ohio reported little if any rain during July 10-20; however, the next ten days were stormy statewide. On and off, scattered showers and storms were widespread throughout the July 21-28 period. The most notable storm occurred during July 26-27 when as much as 8 inches of rain fell over portions of Fairfield and Licking counties. Severe flooding occurred in the South Fork Licking River watershed closing Interstate 70 for nearly two days. These counties received Small Business Administration disaster declarations.

Precipitation for the 1997 calendar year is above normal throughout most of the state, but slightly below normal in the Northeast, Central Hills, and Northeast Hills regions. The state average is 24.74 inches, 1.22 inches above normal. Regional averages range from 28.29 inches, 2.04 inches above normal, for the South Central Region to 22.01 inches, 0.14 inch below normal, for the Northeast Region.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 34.36 inches, 3.27 inches above normal. Regional averages range from 37.44 inches, 3.22 inches above normal, for the South Central Region to 32.58 inches, 1.01 inches above normal, for the Northeast Hills Region.

PRECIPITATION JULY 1997

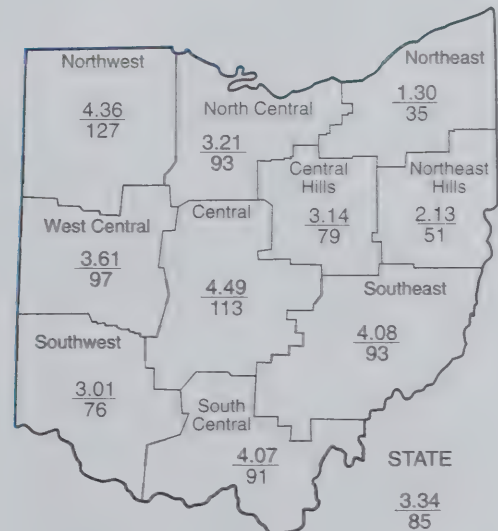


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +0.92 | +4.77 | +4.70 | +5.03 | +5.88 | +3.1 |
| North Central | -0.25 | +3.36 | +4.14 | +8.27 | +11.63 | +2.6 |
| Northeast | -2.38 | +0.48 | +0.54 | +8.00 | +13.58 | -0.5 |
| West Central | -0.10 | +2.13 | +0.90 | +2.42 | +12.95 | +2.1 |
| Central | +0.53 | +3.17 | +1.43 | +2.06 | +11.51 | +0.8 |
| Central Hills | -0.85 | +2.13 | +0.77 | +4.71 | +11.79 | +0.9 |
| Northeast Hills | -2.08 | +0.27 | -1.01 | +2.39 | +7.07 | -0.9 |
| Southwest | -0.96 | +2.47 | +2.18 | +3.41 | +18.52 | +0.4 |
| South Central | -0.39 | +0.52 | +2.89 | +3.14 | +12.85 | +1.8 |
| Southeast | -0.29 | +0.79 | +1.02 | +1.15 | +10.88 | +0.2 |
| State | -0.58 | +2.01 | +1.76 | +4.06 | +11.69 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|----------|
| | | | | 3 Mos. | 6 Mos. | *12 Mos. |
| Grand River near Painesville | 685 | 43 | 15 | 238 | 131 | 145 |
| Great Miami River at Hamilton | 3,630 | 1,960 | 134 | 170 | 118 | 135 |
| Huron River at Milan | 371 | 122 | 167 | 314 | 178 | 194 |
| Killbuck Creek at Killbuck | 464 | 173 | 95 | 166 | 112 | 148 |
| Little Beaver Creek near East Liverpool | 496 | 154 | 73 | 140 | 103 | 119 |
| Maumee River at Waterville | 6,330 | 6,665 | 296 | 288 | 158 | 151 |
| Muskingum River at McConnellsville | 7,422 | 3,600 | 83 | 143 | 105 | 122 |
| Scioto River near Prospect | 567 | 130 | 127 | 179 | 103 | 141 |
| Scioto River at Higby | 5,131 | 3,985 | 200 | 203 | 120 | 139 |
| Stillwater River at Pleasant Hill | 503 | 174 | 126 | 237 | 136 | 135 |

STREAMFLOW during July was above normal in the western half of the state and below normal in much of the eastern half. Flows in northwestern and central Ohio were high enough to be considered excessive, while flows in extreme northeastern Ohio were low enough to be considered deficient. Flows during July were markedly less than the extremely high flows recorded during June.

Flows at the beginning of the month were above normal throughout the state. The only exception was in extreme northeastern Ohio where flows were below normal. Most areas had their greatest streamflow for the month during July 1-3 as scattered storms added runoff to streams already flowing at above-normal levels.

Generally, flows declined throughout the month with slight rises noted following local precipitation. Some areas had their highest flows following some of these storm events including northwestern Ohio on July 9-10, and central and north-central Ohio on July 27-28. Severe flooding occurred in Fairfield and Licking counties during July 27-28. These counties received Small Business Administration disaster declarations.

The lowest flows for July occurred during July 21-22 in most drainage basins and at the end of the month in the northeastern area of the state. At the end of July, flows were noticeably below normal throughout the state except in the central Ohio where flows were still above normal due to the flooding of earlier that week.

RESERVOIR STORAGE for water supply declined during July in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of July in the Mahoning basin index reservoirs was 86 percent of rated capacity for water supply compared with 99 percent for last month and 92 percent for July 1996. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with 102 percent for last month and 94 percent for July 1996. Surface-water supplies continue to remain in good condition throughout most areas of the state.

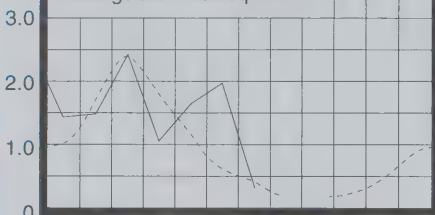
MEAN STREAM DISCHARGE

(4.81-Off the chart)

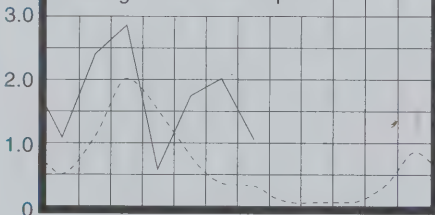
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.

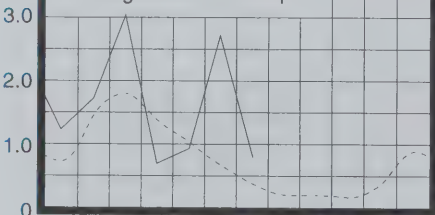


MAUMEE RIVER at Waterville
Drainage area: 6330 sq.mi.



(4.86 - Off the chart)

SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.

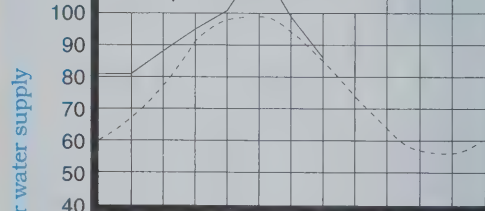


J F M A M J J A S O N D
1997

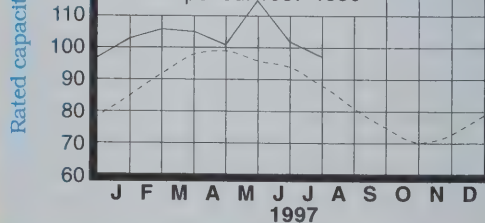
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



J F M A M J J A S O N D
1997

Normal - - - - Current ———

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.40 | -2.28 | -1.10 | -2.72 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 7.83 | -0.03 | -0.46 | -0.56 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.33 | +1.13 | -0.87 | -0.96 |
| H-1 | Harrison, Hamilton Co. | Gravel | 21.73 | +0.23 | -1.94 | -0.83 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.09 | +0.86 | -0.32 | +0.41 |
| Po-1 | Windham, Portage Co. | Sandstone | 18.25 | +1.04 | -0.77 | +0.91 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 13.19 | -0.67 | -1.28 | -0.44 |

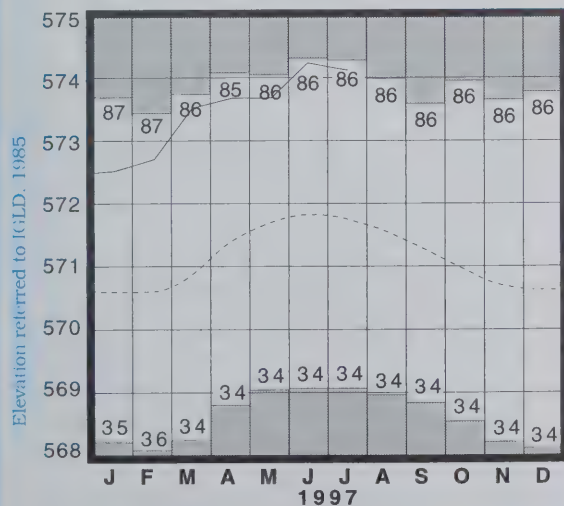
GROUND WATER LEVELS during July declined in all aquifers throughout Ohio. Declines were about what is usually expected during July in the most areas of the state, but were greater than normally expected in northeastern Ohio. Generally, ground levels declined throughout the month with some stabilization or slight rises noted in a few aquifers during the last week.

Ground water levels continue to remain near or above normal in most areas of the state. A few exceptions are noted in some aquifers in eastern Ohio where levels are below normal. Generally, current levels are lower than they were a year ago except in consolidated aquifers in northern Ohio where they are higher. Many areas of Ohio were rather dry during the middle two weeks of July. In spite of this, ground water supplies remain in a favorable position throughout the state. At the end of July, the Ohio Agricultural Statistics Service reports that soil moisture was rated as being short or very short in 33 percent of the state, adequate in 64 percent of the state, and surplus in 3 percent of the state.

LAKE ERIE level declined during July. The mean level was 574.11 feet (IGLD-1985), 0.14 foot below last month's mean level and 2.36 feet above normal. This month's level is 1.14 feet above the July 1996 level and 4.91 feet above Low Water Datum. This month's level was 0.17 foot below the record-high July level at Fairport established in 1986.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during July averaged 2.6 inches, 0.7 inch below normal. The entire Great Lakes basin averaged 2.9 inches of precipitation during July, 0.2 inch below normal. For calendar year 1997 through July, the Lake Erie basin has averaged 21.4 inches of precipitation, 1.0 inch above normal, and the entire Great Lakes basin has averaged 18.9 inches, also 1.0 inch above normal.

LAKE ERIE LEVELS at Fairport

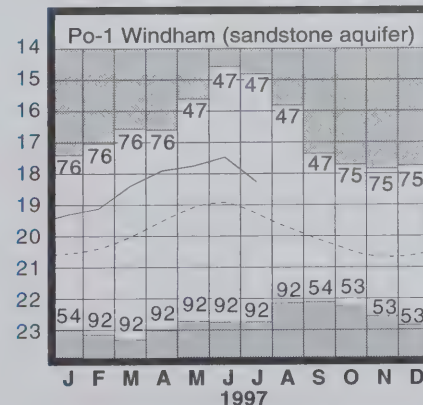
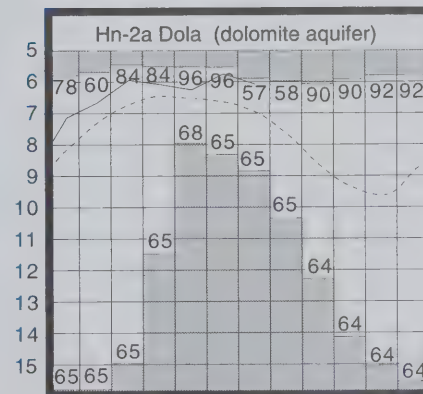
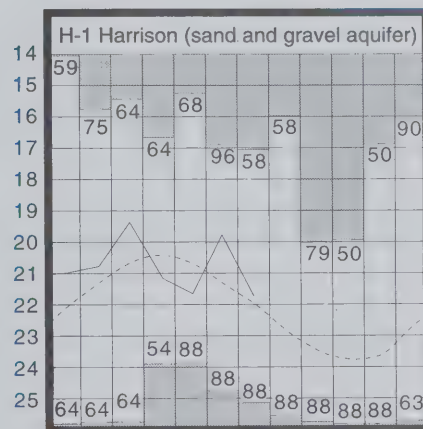


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was below normal in many areas of the state but above normal in central and northwestern Ohio. Streamflow was above normal in western Ohio and below normal in some eastern areas of the state. Fairfield and Licking counties received disaster declarations following severe flooding on July 27-28. Reservoir storage decreased but remained at above-normal seasonal levels. Ground water levels declined statewide but remain in a favorable position. Lake Erie level declined 0.14 foot and was 2.36 feet above the long-term July average.

NOTES AND COMMENTS

NEW ADMINISTRATIVE ORGANIZATION FOR DIVISION OF WATER

The Division of Water has recently gone through a reorganization. Effective August 3, the three sections of the Division of Water have been combined into two new sections: the Water Resources Section and the Water Engineering and Management Section. The functions from the former Water Planning and Management Section have been split and added to the two new sections. The water planning functions have been added to the Water Resources Section and the Floodplain Management Unit was transferred to the new Water Engineering and Management Section. Mark Ogden, P.E., is the Administrator of the Water Engineering and Management Section. Ted Lozier, P.E., is the Administrator of the Water Resources Section.

The purpose of the reorganization is to increase management efficiency and realign programs in order to enhance interdisciplinary collaboration on our programs. All the current staff and programs have been retained and the Division will provide the same services as before.

COASTWEEKS '97

Coastweeks '97 is Ohio's annual celebration of Lake Erie. This celebration is part of a national three-week celebration of our nation's waters and shorelines. It features many activities including clean-ups, hikes, festivals, tours, and many other special programs. These events will be held from August 30 through September 21, 1997 all along Lake Erie's shoreline and on the islands.

Ohio's Coastweeks events are designed to encourage Ohioans of all ages to learn how they can help protect and preserve our Great Lake. In its sixth year, Coastweeks continues to offer many unique educational, environmental, and recreational activities. This year's program focuses on the theme, "I Can Help Lake Erie." People are encouraged to be part of the solution, not the pollution that finds its way into the lake.

Two additional features are also included as part of the Coastweeks activities. One feature is an amateur photography contest. The sixth annual Life on Lake Erie Photo Contest is designed to encourage participants to visit the shorelines of Lake Erie to take photographs and develop a greater appreciation of the lake. Cash prizes will be awarded to the winners.

The other feature is a 3-day Lake Erie environmental program. The Governor's Lake Erie Commission and the International Joint Commission will host the event to be held September 18-20, 1997 at the Great Lakes Science Center in Cleveland.

Everyone is invited to celebrate Lake Erie and participate in the exciting events. For more information about Ohio's Coastweeks '97 including the photography contest and the environmental program, contact the Ohio Lake Erie Office, One Maritime Plaza, Toledo, Ohio 43604-1866, phone: (419) 245-2514, e-mail: oleo@great-lakes.net.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

Department
of Natural
Resources



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



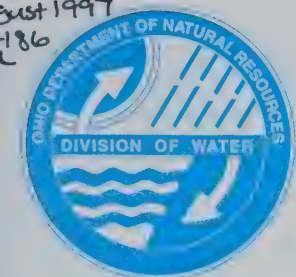
George V. Voinovich
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Donald C. Anderson
DIRECTOR

Michele Willis
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

August 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

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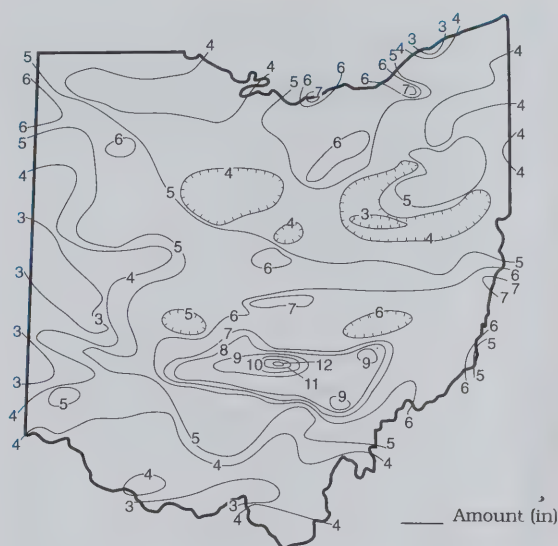
PRECIPITATION during August was above normal throughout most of the state with only a few locations in western and southern Ohio having below normal rainfall. The state average was 4.86 inches, 1.38 inches above normal. Regional averages ranged from 6.80 inches, 2.96 inches above normal, for the Southeast Region to 3.86 inches, 0.39 inch above normal, for the Southwest region. This was the sixth wettest August during the past 103 years in the Central Region and the seventh wettest in the Southeast Region. Rockbridge (Hocking County) reported the greatest amount of precipitation during August, 12.09 inches. Portsmouth (Scioto County) reported the least amount 2.30 inches.

Precipitation during August fell as showers and thundershowers typical of the season. Most of the precipitation fell during the middle of the month as the first 10 and last 10 days were much drier, although scattered storms during August 3-4 were locally severe with more than 1 inch of rain falling in many areas. Welcome drying occurred during the next several days following these storms, but rain showers returned August 12 and continued falling on and off for the next 10 days. The strongest storms during this period crossed the state during August 16-17. More than 6 inches of rain was reported in some areas of central and southeastern Ohio from these storms. Moderate to locally severe flooding occurred in portions of Athens, Hocking, and Perry counties following these storms. For the entire 10-day period, more than 3 inches fell in most locations from northwestern Ohio down through the central part of the state and into southeastern Ohio. Much needed drying conditions prevailed throughout the state during the last week of the month with only a few light, scattered showers reported with some isolated stronger storms in northern Ohio.

Precipitation for the 1997 calendar year is above normal throughout most of Ohio with only the Northeast Hills Region having slightly below normal precipitation. The state average is 29.59 inches, 2.59 inches above normal. Regional averages range from 33.22 inches, 3.08 inches above normal, for the South Central Region to 26.47 inches, 0.92 inch above normal, for the Northeast region. Precipitation in the Northeast Hills Region averages 26.69 inches, 0.69 inch below normal.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 39.22 inches, 4.65 inches above normal. Regional averages range from 42.37 inches, 4.26 inches above normal, for the South Central Region to 37.16 inches, 2.07 inches above normal, for the Northeast Hills Region.

PRECIPITATION AUGUST

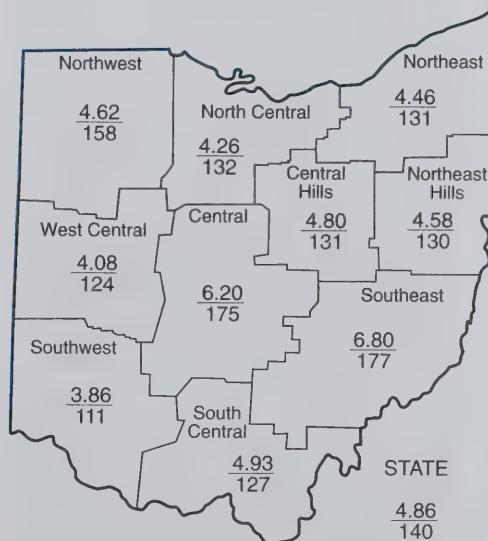


PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|---|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.69 | +3.02 | +4.66 | +8.15 | +7.22 | +3.7 |
| North Central | +1.03 | +1.45 | +3.75 | +11.69 | +11.77 | +3.5 |
| Northeast | +1.06 | 0.00 | +1.27 | +10.10 | +15.81 | +0.7 |
| West Central | +0.78 | +2.19 | +1.43 | +5.85 | +11.33 | +2.7 |
| Central | +2.65 | +4.94 | +4.54 | +6.94 | +12.07 | +2.3 |
| Central Hills | +1.14 | +1.12 | +2.07 | +7.50 | +11.42 | +2.2 |
| Northeast Hills | +1.06 | -0.54 | +0.56 | +4.71 | +8.57 | -0.3 |
| Southwest | +0.39 | +1.16 | +3.15 | +5.97 | +17.16 | +0.9 |
| South Central | +1.04 | +1.77 | +4.83 | +5.66 | +12.30 | +0.4 |
| Southeast | +2.96 | +3.15 | +4.77 | +6.43 | +14.24 | +2.5 |
| State | +1.38 | +1.83 | +3.11 | +7.30 | +12.21 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

This Month

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 58 | 52 | 196 | 121 | *144 |
| Great Miami River at Hamilton | 3,630 | 1,208 | 130 | 223 | 111 | 134 |
| Huron River at Milan | 371 | 163 | 340 | 340 | 163 | 198 |
| Killbuck Creek at Killbuck | 464 | 139 | 109 | 202 | 119 | 147 |
| Little Beaver Creek near East Liverpool | 496 | 160 | 154 | 193 | 102 | 120 |
| Maumee River at Waterville | 6,330 | 3,589 | 538 | 416 | 162 | 154 |
| Muskingum River at McConnelsville | 7,422 | 4,393 | 167 | 180 | 106 | 124 |
| Scioto River near Prospect | 567 | 138 | 339 | 267 | 104 | 142 |
| Scioto River at Higby | 5,131 | 5,082 | 434 | 330 | 134 | 144 |
| Stillwater River at Pleasant Hill | 503 | 81 | 138 | 349 | 120 | 136 |

STREAMFLOW during August was above normal throughout most of the state, but below normal in extreme northeastern Ohio. Flows in all areas except southwestern and northeastern Ohio were high enough to be considered excessive. The mean flow of 3,589 cfs at the Maumee River at Waterville gauging station was its third greatest flow for August. In addition, the daily mean flow of 19,700 cfs on August 18 was the greatest ever recorded in August at the Waterville gauge. August flows in the western half of Ohio declined seasonally from the flows recorded during July while in the eastern half of the state, August flows were greater than the July flows.

Flows at the beginning of the month were below normal in northeastern Ohio and slightly above normal elsewhere. An excep-

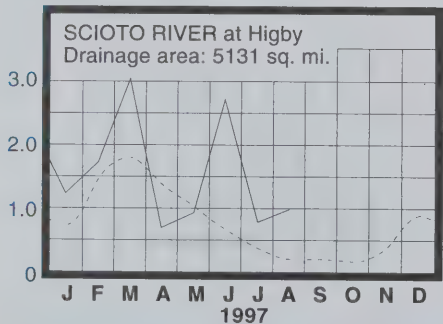
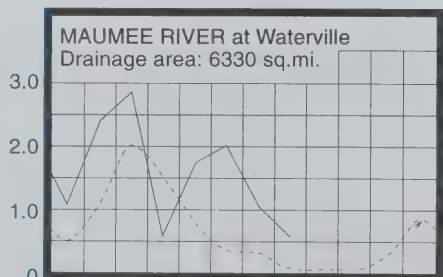
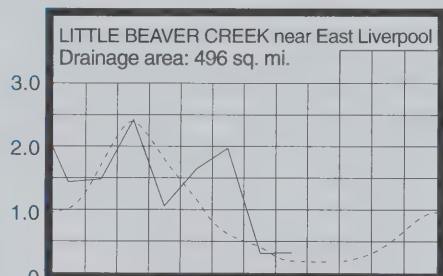
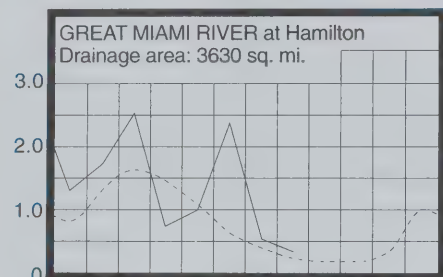
tion was in some central and southeastern areas of the state where flows were noticeably above normal, still responding to precipitation that fell just a few days before the end of July. Generally, flows declined until a few days before the middle of the month with the lowest flows for August occurring within a day or two of August 12. Flows increased noticeably after mid-month following several days with widespread precipitation which started on August 12. The greatest flows for the month in nearly all drainage basins occurred on August 18 following strong storms with heavy local precipitation on August 16-17. Moderate to severe flooding occurred in some drainage basins in Athens, Hocking and Perry counties where as much as 6 inches of rain was reported. Flows at the end of the month were above normal throughout most of the state, but below normal in north-central and northeastern Ohio.

RESERVOIR STORAGE for water supply during August decreased seasonally in the Mahoning basin reservoirs but increased slightly in the Scioto basin reservoirs. Storage remained above normal in both basins.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 78 percent of rated capacity for water supply compared with 86 percent for last month and 83 percent for August 1996. Month-end storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared with 97 percent for last month and 81 percent for August 1996. Surface-water supplies continue to remain in good condition throughout the state.

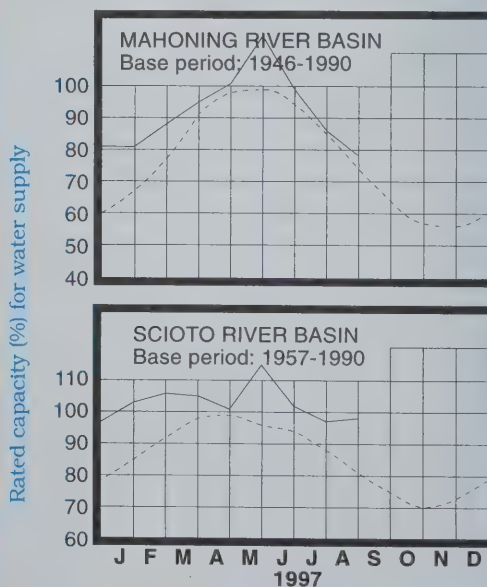
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.68 | -1.89 | -0.28 | -2.59 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.31 | -0.03 | -0.48 | -0.32 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 42.91 | +1.11 | -0.58 | -0.62 |
| H-1 | Harrison, Hamilton Co. | Gravel | 22.57 | +0.24 | -0.84 | -0.62 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.30 | +1.36 | -0.21 | +0.81 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.11 | +0.61 | -0.86 | +0.49 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 14.36 | -1.27 | -1.17 | -0.47 |

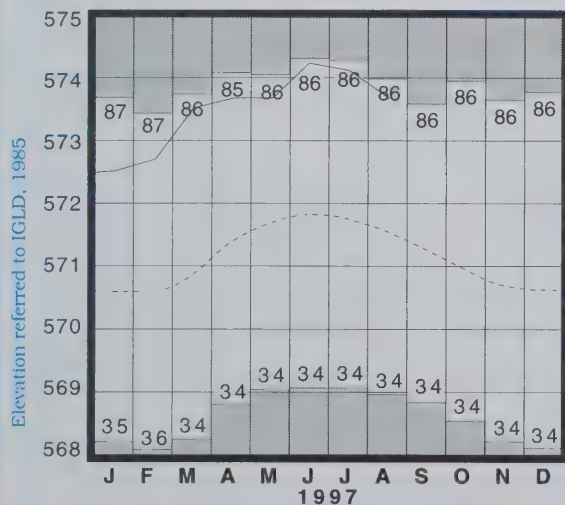
GROUND WATER LEVELS during August declined in all aquifers throughout the state. Ground water levels in some aquifers, especially in northeastern Ohio, declined throughout the month while levels in most aquifers declined during the first half of the month and rose during the second half. Generally, net declines during August were less than usually expected in consolidated aquifers and greater than usually expected in unconsolidated aquifers.

Ground water supplies continue to remain adequate throughout the state even though current levels are lower than they were a year ago in many aquifers. Consolidated aquifers in northern Ohio are an exception where this year's levels are higher than last year's levels. Levels are above normal in most areas of the state, but below normal in some aquifers in eastern Ohio. Most areas of Ohio have had some drying periods during the growing season months but generally, soil moisture has been adequate throughout the period. Near the end of August, the Ohio Agricultural Statistics Service reports that soil moisture was rated as being adequate in 87 percent of the state, short in 3 percent of the state and surplus in 10 percent of the state.

LAKE ERIE level declined during August. The mean level was 573.69 feet (IGLD-1985), 0.42 foot below last month's mean level and 2.13 feet above normal. This month's level is 0.89 foot above the August 1996 level and 4.49 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during August averaged 4.0 inches, 0.8 inch above normal. The entire Great Lakes basin averaged 3.5 inches of precipitation during August, 0.4 inch above normal. For calendar year 1997 through August, the Lake Erie basin has averaged 25.4 inches of precipitation, 1.8 inches above normal, and the entire Great Lakes basin has averaged 22.4 inches, 1.4 inches above normal.

LAKE ERIE LEVELS at Fairport

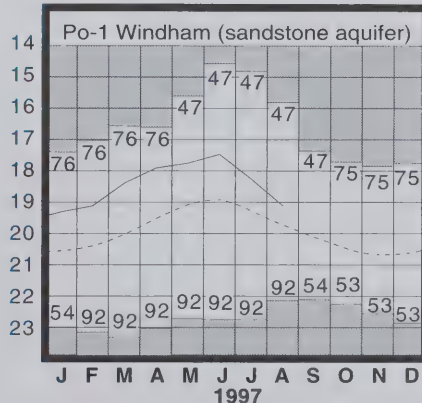
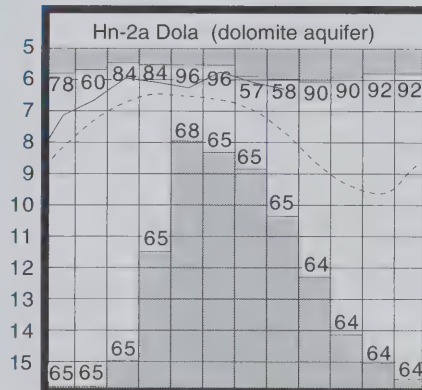
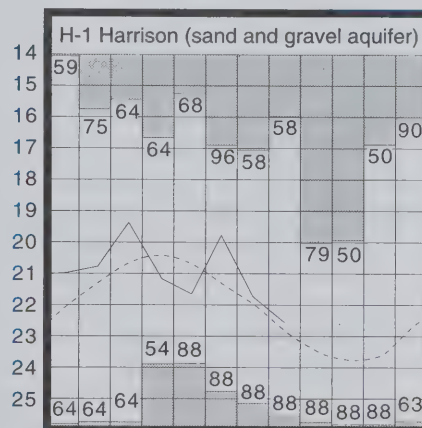


Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS

Water level (ft below land surface)



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current ———

SUMMARY

Precipitation was above normal throughout most of Ohio. Streamflow was noticeably above normal in all areas of the state except extreme northeastern Ohio where it was below normal. Reservoir storage decreased but remained above normal. Ground water levels declined and remain adequate statewide. Lake Erie level declined 0.42 foot and was 2.13 feet above the long-term August average. Water supplies are in a good position as the end of the summer season nears.

NOTES AND COMMENTS

ODNR's Strategic Plan For Lake Erie's Coast

The Ohio Department of Natural Resources (ODNR) has identified management of Lake Erie's coast as one of the department's five strategic priorities and has set out to address the coastal issues on a department-wide basis. The first step was the creation of an interdivisional team which investigated and prepared a strategic plan for Lake Erie's coast which has just been completed.

The four goals for ODNR's strategic plan for Lake Erie's coast are: 1) Manage and protect resources; 2) Provide up-to-date technical assistance and information; 3) Build public and private support to protect Ohio's coast; and 4) Provide more consultation and educational resources within the coastal area. Eleven strategies were formulated to address these goals.

The next steps (implementing the plan) are now being coordinated through the Coastal Management Program within the Division of Real Estate and Land Management (REALM). Two printed publications outlining the needs and strategies have been prepared to help educate the public about the unique challenges of the Lake Erie coast: a simple one-color question-and-answer brochure; "What every Citizen Should Know," and a more detailed four-color brochure, "Where the Water Meets the Land...ODNR's Strategic Plan for Lake Erie's Coast."

Copies of the brochure and the strategic plan are available from REALM at 1-888-232-ERIE (3743).

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Perry County
by Paul Spahr and Christine Straub

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from: ODNR Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224-1336, phone (614) 265-6740.

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

The U. S. Geological Survey, Water Resources Division, announces the availability of the following new publication:

Effects of Highway Deicing Chemicals on Shallow Unconsolidated Aquifers in Ohio, Interim Report, 1988-93 (U. S. Geological Survey-Water Resources Investigations Report 97-4027)

by Allison L. Jones and Bernard N. Sroka

This interim report discusses the effects of the application of highway deicing chemicals during winter months on ground-water quality at eight sites throughout Ohio. The sites are located in Ashland, Ashtabula, Champaign, Clark, Lucas, Pickaway, Portage, and Richland counties along major undivided highways where drainage is by open ditches and ground-water flow is approximately perpendicular to the highway. At each location, records of deicer application rates are being kept and apparent movement of deicing chemicals through shallow, unconsolidated aquifers is being monitored by means of periodic measurements of specific conductance and concentrations of dissolved sodium, calcium, and chloride. Evidence indicates that some of the sites are potentially affected by the direct application of deicing chemicals.

A limited number of this new publication is available from the U. S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43212-3192, phone (614) 469-5553.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.

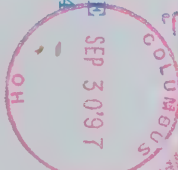
Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District; Palmer Drought Severity Index; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



George V. Volnovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

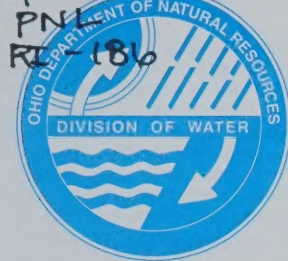
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Sept. 1997



MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1997

PNL
RI-186

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

PRECIPITATION during September was below normal in the southern two-thirds of Ohio and above normal in the northern third. The state average was 2.32 inches, 0.68 inch below normal. Regional averages ranged from 4.15 inches, 1.30 inches above normal, for the Northwest Region to 0.95 inch, 2.14 inches below normal, for the Southwest Region. This was the sixth driest September in the Southwest Region during the past 102 years. Wauseon (Fulton County) reported the greatest amount of precipitation for the month, 5.72 inches. Oxford (Butler County) reported the least amount, 0.41 inch.

Precipitation during September fell as light showers with only some areas in northern Ohio having stronger storms. The first week of September was rather dry with only a few light scattered showers falling. Heavier showers crossed the state, especially northern Ohio, during September 9-10. Some areas received more than 1.5 inches of rain with amounts tapering to less than 0.5 inch in southern Ohio. More strong storms crossed northern Ohio during September 19-20 with more than 1 inch of rain reported at many locations. Central and southwestern Ohio received very little rain during this period. A few light, scattered showers fell during the remainder of the month, but rain amounts were small.

Precipitation for the 1997 calendar year is above normal in most areas of the state, but slightly below normal in the West Central and Northeast Hills regions. The state average is 31.91 inches, 1.91 inches above normal. Regional averages range from 35.02 inches, 1.70 inches above normal, for the South Central region to 28.83 inches, 0.49 inch below normal, for the West Central Region.

Precipitation for the 1997 water year was above normal throughout most of the state with only a few isolated locations having below normal precipitation. The state average was 41.57 inches, 4.00 inches above normal. Regional averages ranged from 44.17 inches, 2.88 inches above normal, for the South Central Region to 38.55 inches, 1.86 inches above normal, for the West Central Region (see Precipitation table, departure from normal, past 12 months column). Ripley (Brown County) reported the greatest amount of precipitation during the 1997 water year, 56.16 inches. Chardon (Geauga County) reported 55.61 inches, the only other location reporting more than 55 inches. Dayton International Airport (Montgomery County) reported the least amount, 34.49 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1997 water year appear on the last page of this report.

The 1997 water year started off with below normal precipitation during October except in northeastern Ohio where it was above normal. Conditions changed quickly during November with above normal precipitation recorded statewide.

(continued on back)

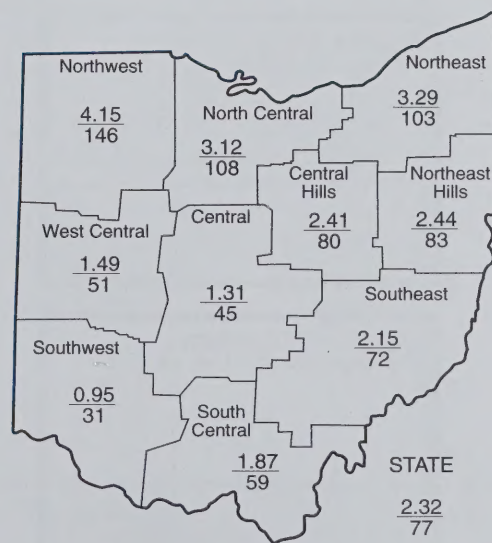
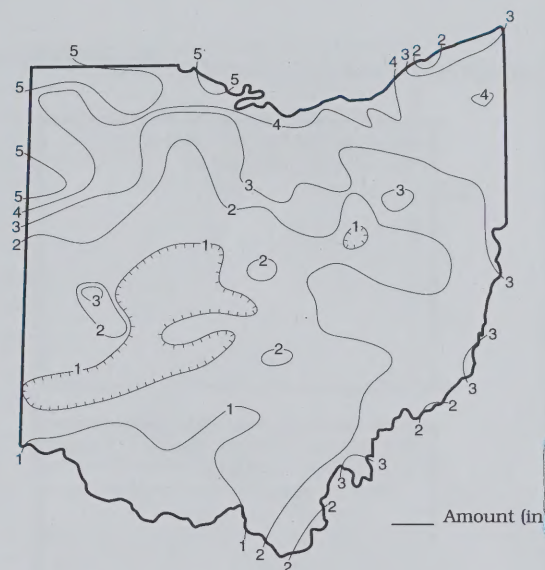
PRECIPITATION

| Region | DEPARTURE FROM NORMAL (IN.) | | | | | Palmer Drought Severity Index* |
|-----------------|-----------------------------|--------|--------|---------|---------|--------------------------------|
| | This Month | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | +1.30 | +3.94 | +5.55 | +9.37 | +10.18 | +3.7 |
| North Central | +0.24 | +1.08 | +3.46 | +7.81 | +13.92 | +3.5 |
| Northeast | +0.11 | -1.26 | +0.62 | +5.16 | +17.79 | +1.9 |
| West Central | -1.44 | -0.66 | -0.90 | +1.86 | +11.48 | +1.9 |
| Central | -1.58 | +1.45 | +1.61 | +2.62 | +11.82 | +2.0 |
| Central Hills | -0.62 | -0.21 | +1.24 | +3.57 | +12.97 | +1.5 |
| Northeast Hills | -0.50 | -1.51 | -0.66 | +1.69 | +9.71 | -0.4 |
| Southwest | -2.14 | -2.71 | -1.39 | +1.47 | +16.71 | -0.1 |
| South Central | -1.31 | -0.78 | -2.19 | +2.88 | +12.14 | -0.2 |
| Southeast | -0.84 | +1.81 | +1.15 | +3.43 | +14.71 | +1.7 |
| State | -0.68 | +0.12 | +0.85 | +4.00 | +13.18 | |

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

PRECIPITATION SEPTEMBER



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | This Month | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | % of Normal Past | | |
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| Grand River near Painesville | 685 | 72 | 32 | 18 | 113 | 139 |
| Great Miami River at Hamilton | 3,630 | 739 | 96 | 115 | 101 | 133 |
| Huron River at Milan | 371 | 159 | 483 | 214 | 194 | 199 |
| Killbuck Creek at Killbuck | 464 | 93 | 92 | 95 | 108 | 143 |
| Little Beaver Creek near East Liverpool | 496 | 187 | 203 | 105 | 104 | 120 |
| Maumee River at Waterville | 6,330 | 4,176 | 658 | 377 | 153 | 160 |
| Muskingum River at McConnelsville | 7,422 | 1,903 | 97 | 99 | 97 | 123 |
| Scioto River near Prospect | 567 | 25 | 81 | 133 | 108 | 142 |
| Scioto River at Higby | 5,131 | 2,142 | 175 | 214 | 134 | 145 |
| Stillwater River at Pleasant Hill | 503 | 51 | 103 | 104 | 119 | 135 |

STREAMFLOW during September was slightly below normal in portions of southwestern, east-central and extreme northeastern Ohio and above normal in northwestern, north-central and central Ohio. Flows in extreme northeastern Ohio were low enough to be considered deficient while flows in northwestern and north-central Ohio were high enough to be considered excessive.

Flows at the beginning of the month were above normal in most areas of the state with only northeastern Ohio having below normal flows. The lowest flows in September occurred during September 8-9 for drainage basins in northern Ohio and at the end of the month for basins in the southern two-thirds of the state. The greatest flows for September occurred during September 11-12 in the southern Ohio drainage basins and during

September 20-23 in the northern Ohio drainage basins. Flows at the end of the month were below normal in most areas of the state, but above normal in northwestern Ohio.

Streamflow during the 1997 water year was above normal throughout the state (see Mean Stream Discharge table, percent of normal past 12 months column). Annual average flows in nearly all drainage basins were high enough to be considered excessive. Flows were above normal statewide during the first half of the water year. Near-record December flows were recorded in many areas of the state. A few areas dried out slightly during February, but heavy storms caused catastrophic flooding in southern Ohio during the first week of March. Although unusually dry conditions during April reduced streamflows to below normal, widespread storms during May and locally severe storms throughout the first half of June caused additional flooding in southern, central and northwestern Ohio. The Scioto River at Higby stream gauging station recorded its highest June flow on record. Portions of northern and eastern Ohio dried out during July and August reducing flows in those areas, but elsewhere flows remained high with additional flooding occurring in central Ohio during July and August. Drier conditions prevailed in the southern half of Ohio during September, but storms crossing northern Ohio kept flows at excessive levels in some drainage basins.

RESERVOIR STORAGE for water supply during September decreased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

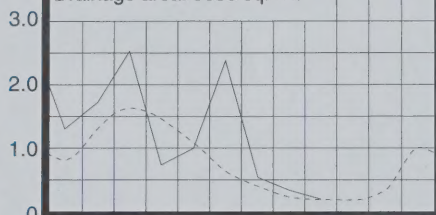
Reservoir storage at the end of September in the Mahoning basin index reservoirs was 74 percent of rated capacity for water supply compared with 78 percent for last month and 83 percent for September 1996. Month-end storage in the Scioto basin index reservoirs was 86 percent of rated capacity for water supply compared with 98 percent for last month and 78 percent for September 1996.

Surface-water supplies were adequate throughout the 1997 water year. Storage in both on- and off-stream reservoirs was near or above normal throughout the year. Adequate precipitation during the summer months helped to reduce demand during this high water-use season.

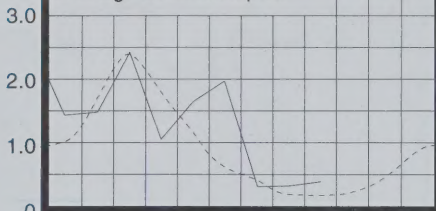
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)

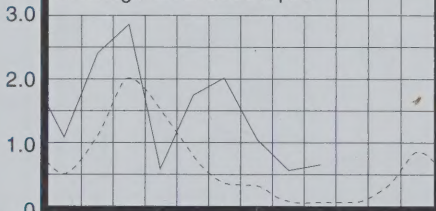
GREAT MIAMI RIVER at Hamilton
Drainage area: 3630 sq. mi.



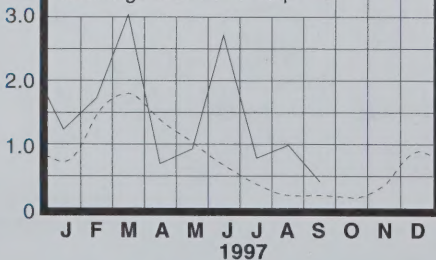
LITTLE BEAVER CREEK near East Liverpool
Drainage area: 496 sq. mi.



MAUMEE RIVER at Waterville
Drainage area: 6330 sq. mi.



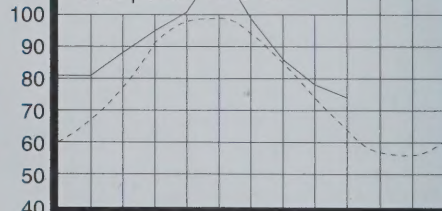
SCIOTO RIVER at Higby
Drainage area: 5131 sq. mi.



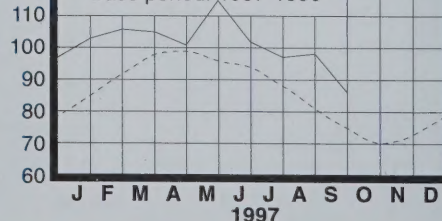
Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY

MAHONING RIVER BASIN
Base period: 1946-1990



SCIOTO RIVER BASIN
Base period: 1957-1990



GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

| Index Well | Location | Aquifer | Mean This Month | Departure From Normal | Change in feet from: | |
|------------|-----------------------------|-----------|-----------------|-----------------------|----------------------|----------|
| | | | | | Last Month | Year Ago |
| F-1 | W. Rushville, Fairfield Co. | Sandstone | 17.47 | -1.05 | +0.21 | -0.51 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 8.63 | +0.04 | -0.32 | +0.21 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 43.35 | +1.15 | -0.44 | -0.46 |
| H-1 | Harrison, Hamilton Co. | Gravel | 23.06 | +0.41 | -0.49 | -0.38 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 6.59 | +2.02 | -0.29 | +1.76 |
| Po-1 | Windham, Portage Co. | Sandstone | 19.75 | +0.37 | -0.64 | +0.28 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 15.04 | -1.53 | -0.68 | -0.49 |

GROUND WATER LEVELS during September declined seasonally from last month's levels in most areas of the state. A few exceptions were observed in consolidated aquifers in southeastern Ohio where levels responded to the noticeably above normal precipitation that fell during August. Generally, levels declined during the first half of the month and were stable during the second half. Net declines during September were about what is usually observed in most aquifers.

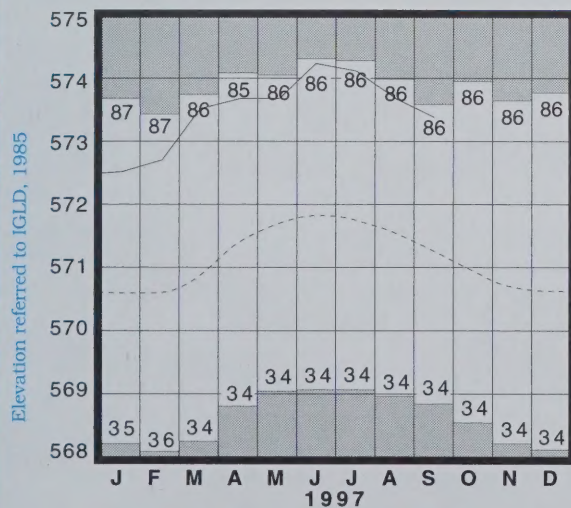
The 1997 water year was generally favorable for ground-water supplies. The water year started with consolidated aquifers at below normal levels and unconsolidated aquifers at above normal levels. Adequate precipitation during November and December soon brought levels in all aquifers up to above normal. Although April was rather dry, precipitation during the recharge period was adequate statewide and ground water supplies were in good condition as the summer season started. Precipitation during the late spring and early summer was abundant in most areas of the state which extended the recharge period in some areas. Although spotty, summer precipitation was abundant in most areas of the state with only northeastern Ohio being rather dry. At the end of the 1997 water year, ground water levels are above normal in most areas of the state, but below normal in some aquifers in eastern Ohio. Current levels are higher than they were a year ago in most consolidated aquifers, but slightly lower than they were a year ago in most unconsolidated aquifers.

LAKE ERIE level declined seasonally during September. The mean level was 573.39 feet (IGLD-1985), 0.30 foot lower than last month's mean level, and 2.13 feet above normal. This month's level is 0.72 foot higher than the September 1996 level and 4.19 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during September averaged 4.1 inches, 1.0 inch above normal. The entire Great Lakes basin averaged 3.2 inches of precipitation during September, 0.2 inch below normal. For calendar year 1997 through September, the Lake Erie basin has averaged 29.4 inches of precipitation, 2.7 inches above normal, and the entire Great Lakes basin has averaged 25.6 inches, 1.2 inches above normal.

Lake Erie's level remained above normal throughout the 1997 water year. High lake levels were, and still are, a concern as the late spring and early summer levels approached the record-high levels established during the mid 1980s. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the foreseeable future.

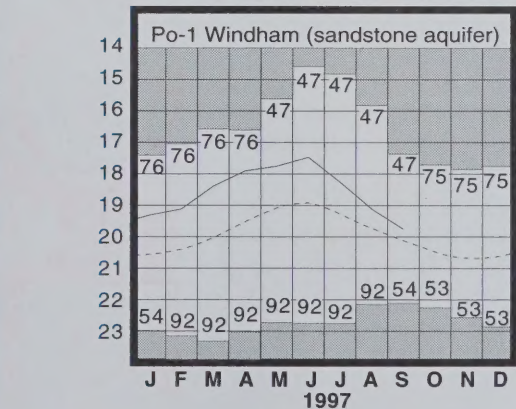
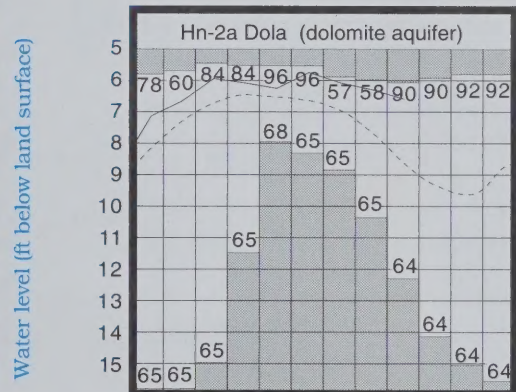
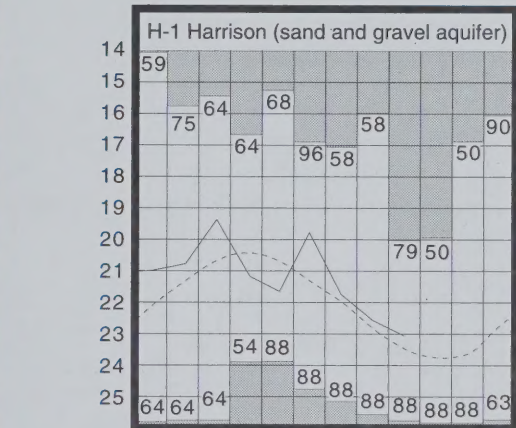
LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

■ Record high and low, year of occurrence

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

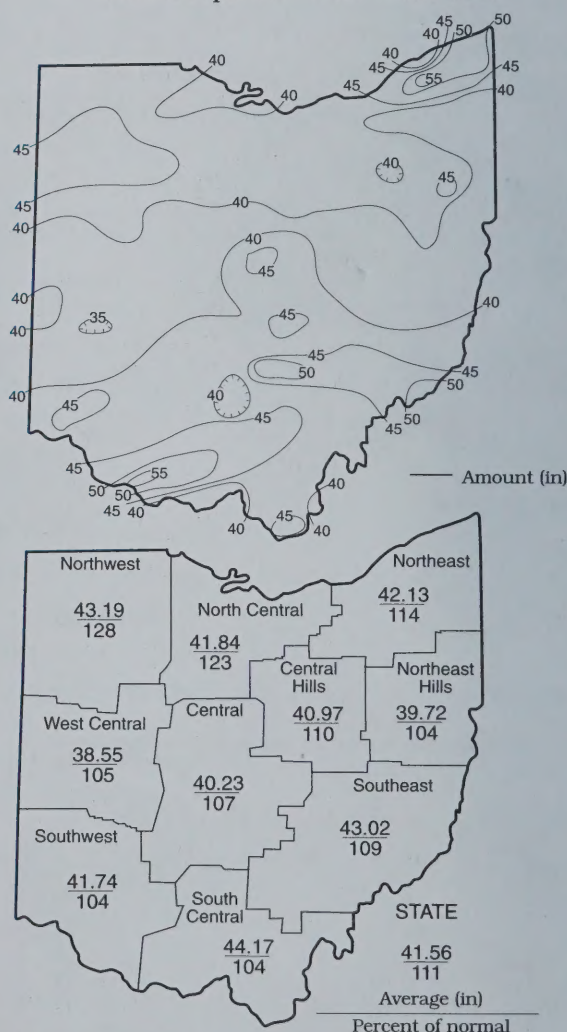
Po-1, 1947-1990 ■ Record high and low, year of occurrence

Normal - - - - Current ———

(continued from front page)

Near-record snow fell in the snowbelt areas east of Cleveland early in November. Precipitation continued to be above normal during December, but fell back to below-normal levels during January with unusually meager amounts of snow reported. February precipitation was above normal across northern Ohio, but continued at below-normal levels in the southern two-thirds of the state. March precipitation was above normal statewide, but unfortunately the month started off with once-in-a-century storms crossing southern Ohio causing catastrophic flooding. The entire state dried out during April with precipitation amounts ranking this as the ninth driest April of record. May was exceptionally wet statewide with some flooding at the end of the month. June rain was above normal, and although there were a few dry areas, especially in north-central Ohio, some areas in central and northwestern Ohio had significant flooding. July was similar to June but with northeastern and southwestern Ohio being the driest areas and localized flooding in central and southeastern Ohio. August precipitation continued this pattern of being wet in most areas but with a few scattered dry areas. More flooding occurred in portions of central and southeastern Ohio. The water year ended as it had started with above normal precipitation in northern Ohio and below normal precipitation in southern Ohio. All in all, the 1997 water year was good for both water supplies and for agriculture.

Total Precipitation 1997 Water Year



SUMMARY

Precipitation during September was above normal in the northern third of the state and below normal in the southern two-thirds. Streamflow was above normal in northwestern, north-central and central Ohio and below normal elsewhere. Reservoir storage decreased but remained at above-normal seasonal levels. Ground water levels declined and are above normal in most aquifers but below normal in some eastern areas of the state. Lake Erie level declined seasonally and was 2.13 feet above the long-term September average.

Precipitation for the 1997 water year was above normal throughout the state. Streamflow was noticeably above normal statewide. Surface-water and ground-water supplies were adequate throughout the year. Lake Erie was near record-high levels during the summer months. The 1997 water year was good for water supplies and agriculture, but also included serious flooding in many areas, most notably in extreme southern Ohio.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:

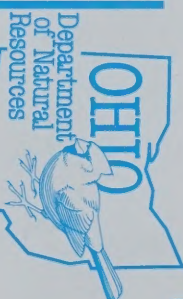
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.

Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.

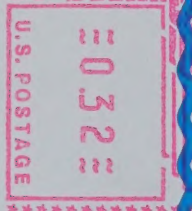
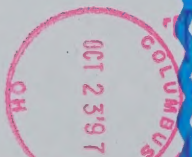
Lake Erie level data:

U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



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